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USER MANUAL

NOMAD



LOW MOUNT | ELECTRIC WINCH | MILSPEC



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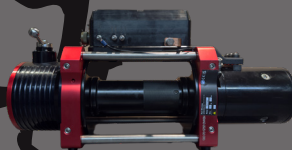
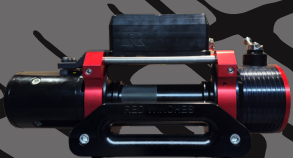
IMPORTANT SAFETY INSTRUCTIONS AND PRODUCT WARNINGS.

Before installation or using your new winch read all instructions, guides and safety information provided.

NOMAD



- > Low Mount style winch
- > Single motor
- > 12v / 24v dc
- > Twin bearing supported friction brake
- > Standard and XL drum lengths available
- > Drum mounted between high load roller bearings
- > Three gearboxes available in same design: 5.5t & 4t
- > Three capacity options: 4.5t (9,920 lbs) & 5.5t (12,000 lbs)
- > Ox motor fitted on all options for the ultimate power behind your winching



This winch is a RED Winches designed product, whose designs have undergone extensive testing. The end user can now enjoy a professional highly engineered, precision, high performance electric winch capable of operating in the most demanding of situations. The small compact size combined with its pulling power and solid billet machined cnc housings make it an ideal winch for maximum impact when faced with minimal installation space.

NOMAD SERVICING



SERVICING AND MAINTENANCE

The Nomad is modular, bolted construction, free from castings, allows for straightforward servicing and full rebuilds, with all components supplied by RED Winches. RED Winches provides a full service of your winch please contact sales@red-winch.com.

Date of Service
 Serial No
 Type of Winch
 Signed
 Print Name

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The Nomad is an excellent choice for compact, powerful, low-line electric winching, ideal for all your recovery needs. Designed for use on-road, off-road, during expeditions, or for weekend trips, the Nomad gives you the confidence to explore in any condition.

RED Winches has developed this winch for serious, dependable use. Whether fitted to a road-going vehicle or a fully equipped 4x4 recovery truck, the Nomad performs reliably and powerfully.

Manufactured from solid billet aluminium, the Nomad shares the same high engineering standards as all RED Winches products. All Nomad winches feature solid copper bus bars, delivering battery power efficiently to the OX motor, which in turn powers the gearbox for maximum performance.

NOMAD OPTIONS

The Nomad offers a range of options, allowing you to tailor your recovery setup to your specific needs:

Capacities:

4.5 tonne or 5.5 tonne and 7.5 toone

Choose based on your vehicle's mounting capacity or the recoveries you intend to perform.

Power Supply Options:

12V for car-based electrical systems

24V for military, van or lorry-based circuits

Control Options (all interchangeable and compatible):

Wireless Handheld Remote (Fitted as standard)

Milspec Hand Controller with built-in LED (optional)

Hard-wired Dash Switch Connections

Drum Width Options:

Standard or XL Drum providing increased rope capacity for more demanding recovery situations.

WHAT'S IN THE BOX

NOMAD

Rope & Hook

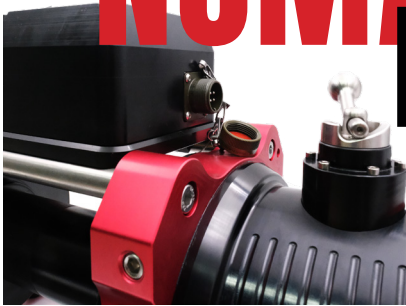
Wireless Hand Controller

Positive Cable

Negative Cable

Mounting Bolts & Washers

red- **NOMAD** FEATURES



Robust control box. cnc machined to give, accuracy, strength and durability

3 Piece drum supported by precision double sealed bearings

The mighty ox motor is a very powerful motor providing high speed and high torque for all winching situations

Albright motor controller mounted and protected inside control box

Manual freespool cam operated stainless steel & sealed shaft for the ultimate protection against the elements.



All aluminium parts anodised to 25 microns thickness

Hawse fairlead aluminium - cnc machined with large radius to extend rope life

Precision engineered billet machined housings and drum ends, the ultimate in strength and design

winch control options from one control box:

1. Wireless (std)
2. Milspec pendant
3. Hard wired dash switch

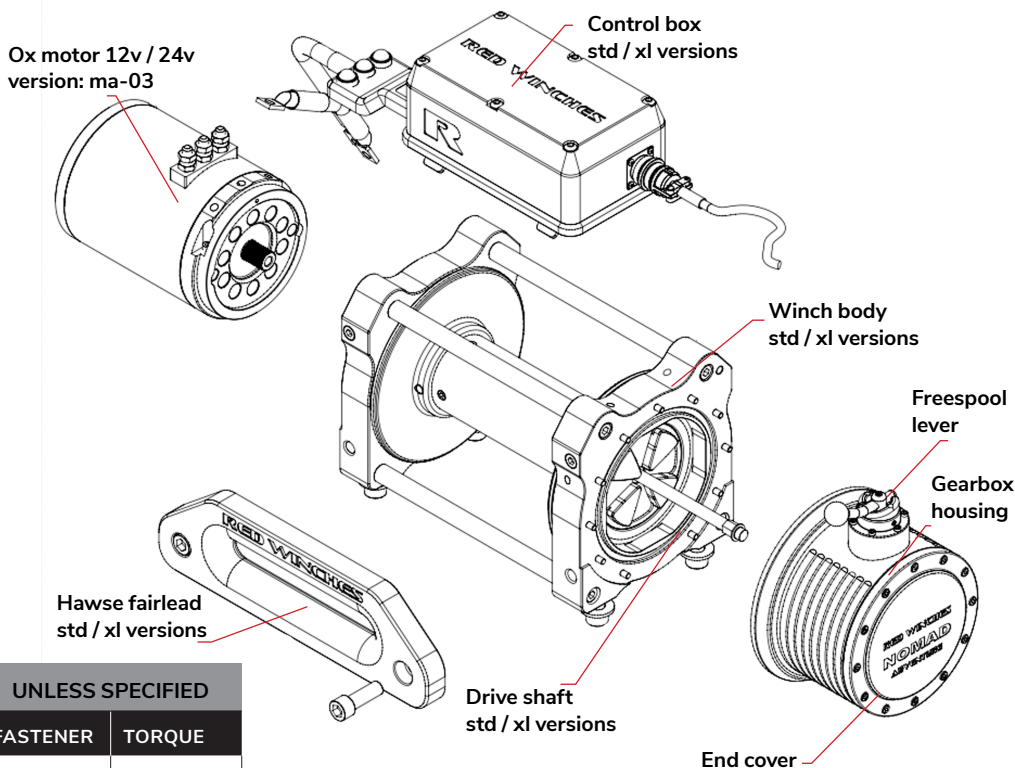
Milspec connection point fitted as standard to all winches. this is used for the wired winch control pendant option (if ordered).



Modern friction brake design, running between a set of bearings for precise concentrically. reducing heat, and increasing braking forces.

NOMAD EXPLODED DIAGRAM

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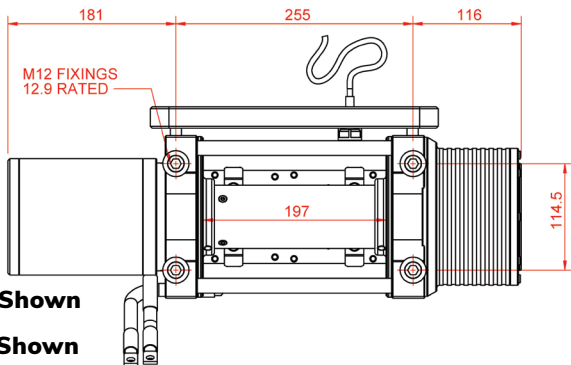
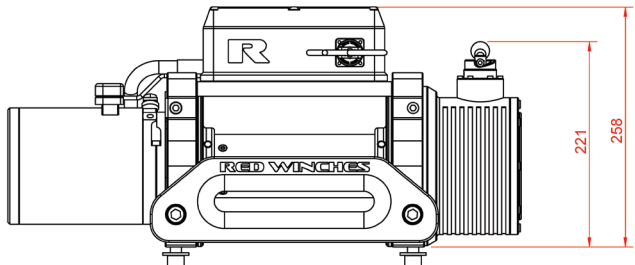
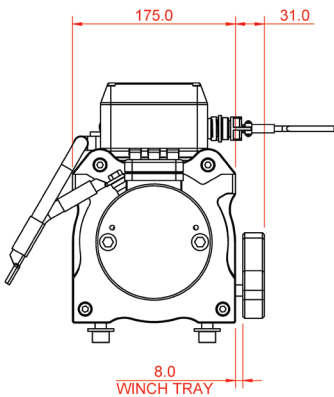
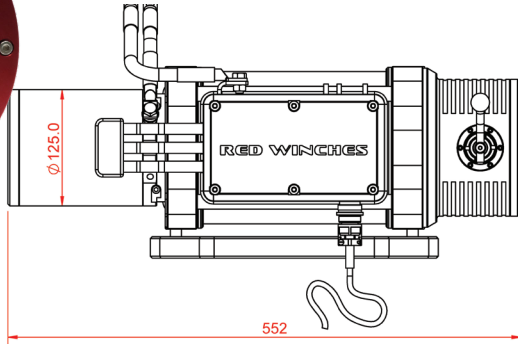
UNLESS SPECIFIED

FASTENER	TORQUE
M6	10 Nm
M8	24 Nm
M10	45 Nm
M12	80 Nm
M16	160 Nm
M20	200 Nm

FASTENERS

Ensure all fasteners are torqued to the correct values. Loctite 234 (thread lock) to be applied on all fasteners

NOMAD DRAWINGS

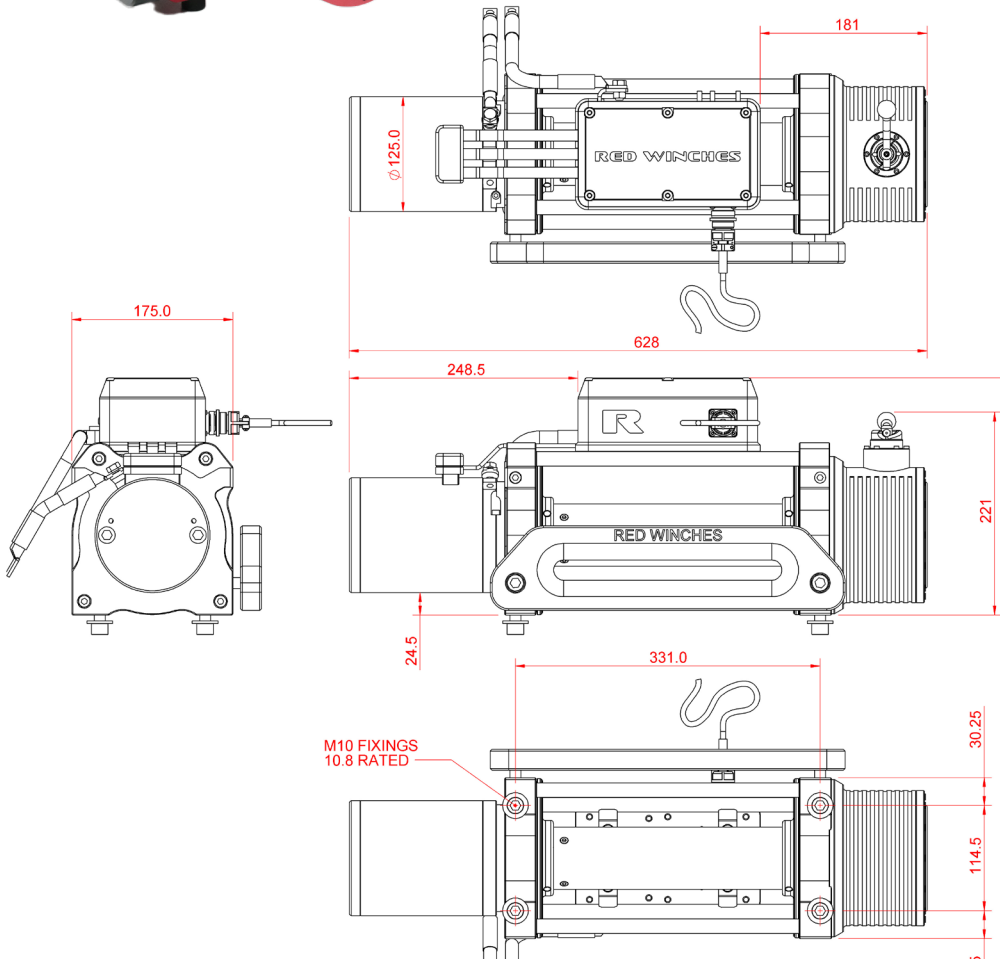


7.5T, 5.5T & 4T Models Shown
Standard Drum Width Shown

NOMAD DRAWINGS



7.5T, 5.5T & 4T Models Shown
XL Drum Width Shown



NOMAD

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CONNECTION DIAGRAM

WARNING

Ensure positive cable lug is insulated from accidental touching and does not touch any surrounding parts or motor buzz bars

Motor voltage rating
(12v or 24v)

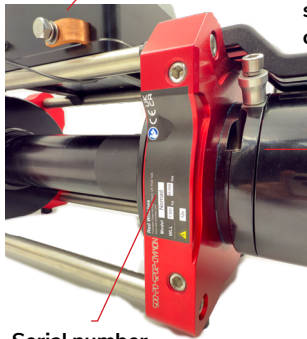
Positive cable from battery to be connected here M8 male thread min cross sectional area of 50mm² cable to be used

Earth connection from battery can go on either one of three m8 threaded holes min cross sectional area of 50mm² cable to be used

Winch out supply from rocker switch on your dash

Winch in supply from rocker switch on your dash

Earth wire from vehicle to provide earth to control box equipment



Ox motor 12v or 24v options

Milspec connector (4 pin)

LED button torch
Push: on
Push: off

3.5m (11.5ft) cable as standard

Hand controller hard wired (4 pin)
winch in winch out illuminated led torch

NOMAD WIRELESS HANDSET

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HAND CONTROLLER OPERATION

On / Off Power Button:

1.5 - 2.5 Second press to turn on / connect.

Quick press to turn off, almost instant.

This quick touch will also function like an emergency stop.

If accidentally pressed, the winch will stop working.

LED:

When the transmitter matches the receiver the LED will be a solid light, when the wireless is communicating the light is fast flickering.

Pairing - To pair any handset to any receiver:

Receiver power OFF

Switch on transmitter

Hold down winch in and winch out at the same time.

Switch on power to the receiver

Keep holding down winch in and winch out for 3+ seconds

Release winch in and winch out



Wireless:

2.4g is what we will use, but can connect 200m away without issues, but it's not very good for penetration resistance (through walls, concrete block etc) 2.4g is universal usage in the world which is why we have used it for this transmitter.



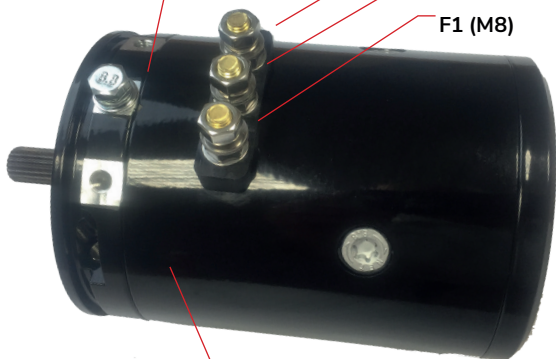
NOMAD OX WINCH MOTOR

Earth connection from battery can go on either one of three m8 threaded holes 70mm2 cable to be used

F2 (M8)

A (M8)

F1 (M8)

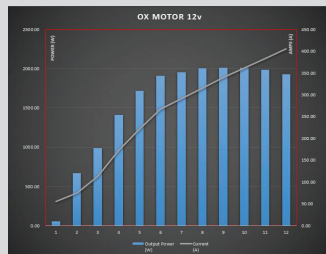
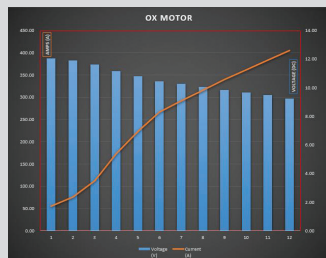
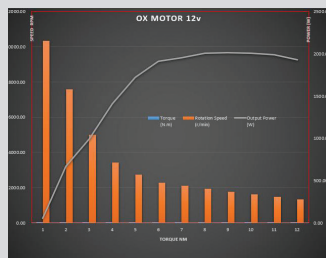


Brush pack at the front of the motor here

WARNING

Never allow the ox motor to overheat or stall this situation can damage the armature and the motor can fail

With the appropriate alternator and battery setup these ox motors will provide high speed and high power for your winch.



NOMAD ROPE & HOOK

Material: 12 Strand UHMWPE

Benefits: Low stretch, high strength,

Easy to splice, Excellent abrasion resistance,

Flexible and easily handled, Good UV resistance

No recoil, No wire splinters,

12 STRAND BRAIDED CONSTRUCTION:

Optimised pitch to yarn twist - improves strength & longevity.

Firmer round rope, aids handling.

Easy to splice.

Flexible product and easily handled.

Torque balanced.

HEAT SET AND PRE-STRETCHED:

Maximises strength/diameter ratio.

Minimises elongation.

COATED FIBRE:

Specially formulated polyurethane coating.

Improves abrasion resistance and durability.

Increases friction, aids handling & splicing.

Colour: Black as standard

Relative Density: 0.97 (floats).

UV Resistance: Very good.

Melting Point: 140oC.

Critical Temperature:: 80oC.



All winches come with our plasma lock as standard. The reliable, and simple way to connect your rope to the drum.

The Nomad Winch is designed for the rope to wind on to the drum from below, only, due to the position of the fairlead.

Rope Size vs Lengths:

STD DRUM:

30m (90') of 11mm (7/16") Dia rope - Standard for Overland and Adventure

25m (82') of 12mm (1/2") Dia rope - Standard for Titan

XL DRUM:

45m (160') of 11mm (7/16") Dia rope- Standard for Overland and Adventure

36m (120') of 12mm (1/2") Dia rope- Standard for Titan



Standard winch recovery hook

WINCH MAINTENANCE

These notes are general guidelines only. Also use your own judgment when to service the winch based on the activities where the winch has been used.

GENERAL MAINTENANCE

The winch is protected from water and rain, but avoid submerging the winch for a prolonged time, particularly if the winch casing is warm / hot.

If it does become submerged, once clear, run the winch in and out for about 10 meters of rope to generate heat inside the winch to help dry the inside of the casing.

To properly care for anodised products, avoid harsh chemicals like TFR (Traffic Film Remover) and caustic-based cleaners, as they can damage the anodised surface. Instead, use pH-neutral, synthetic cleaning products, preferably diluted in warm water for regular maintenance. For stubborn contamination, a non-scratch cleaning pad and water can be used, working with the material's grain. For removing oils or waxes, acetone or a similar solvent can be used, following safety precautions.

When fitting, use anti-seize grease or lubrication on stainless steel bolt threads to prevent them from seizing.

If you were not the last person to use the winch, always inspect the full length of the winch rope before applying any load to it.

Have the winch serviced regularly at an authorised RED Winch centre / Partner / Distributor.

BASIC TROUBLE SHOOTING

Powers in only one direction

Faulty Albright solenoid, damaged remote control or remote control cable. Check remote control plug pins for damage. Check wireless remote is correctly connected.

Completely Dead

Burned motor, poor earth, discharged battery, faulty isolator switch, damaged earth wire, damaged remote control cable or switch. Check remote control pins for damage. Check isolator switch is on. Check power is getting to the winch.

Low Power

Check the condition of the battery and if the alternator is charging correctly, check the voltage to the battery. Are the battery terminals corroded or the cables damaged?

Turn off any electrical items in the vehicle; Radio, lights, heated seats etc.

Winch Will Not Free Spool

Warped mount plate, winch rope bound up on one side of the drum, bent drum flange or gear damage inside the winch.

Check freespool lever is fully dis-engaged (scan QR code for video)

Winch Motor Overheats

Overloaded or stalled during winching operation, Poor earth to battery, worn motor, water or mud in motor. Check the load is not heavier than the rated load. Check all connections and cables.

Connecting power cables are too small.

Winch Brake Will Not Hold

Worn friction material or brake overheated from extended period of powering out.



NOMAD OPERATION

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A REFERENCE GUIDE TO WINCHING

WINCH HANDLING

ESTIMATING WINCH LOADS

Before attempting to move a rolling load with a winch, it is important to estimate the load to ensure that the safe working load limits of the winch and any supporting equipment are not exceeded.

If there is a solid resistance preventing the load from moving, the winch must not be operated under overload conditions. Doing so can result in excessive force and electrical strain on the vehicle. The load to be recovered must be able to move as freely as possible. Before winching, it may be necessary to dig out a trapped wheel or clear away any part of the terrain that is in contact with the load—other than its wheels.

To calculate the total winch load, two main factors should be considered and added together:

1. Ground Inclination

Even a small section—such as a pothole or tree root—can increase the load and must be taken into account.

2. Slope Gradient

On sloping ground, the additional force required can be estimated using the following method:

Divide the gradient angle (in degrees) by 60, then multiply the result by the total load weight.

For example, ascending a 30° slope with a vehicle weighing 2,250 kg:

$30^\circ \div 60 = 0.5 > 0.5 \times 2250 \text{ kg} = 1125 \text{ kg}$ additional load. Please refer to the load estimation table at the rear of this manual for further guidance.



The pull required to move a vehicle varies depending on the type of ground it is positioned on.

The required pulling force, expressed as a percentage of the vehicle's weight, is as follows:

Hard Surface	5%
Grass	15%
Wet Sand	15-20%
Soft Dry Sand	25-30%
Shallow Mud	35%
Bog/Marsh where chassis is not grounded	50%

For example, a 2,250 kg vehicle in shallow mud would require:

$2,250 \div 100 \times 35 = 788 \text{ kg}$ of pulling force.

To calculate the total estimated load when pulling up an incline, add the pulling force required for the gradient to the force required for the ground condition:

Gradient: 1,125 kg + Ground: 788 kg = Total Estimated Load: 1,913 kg

LOADING & ELECTRICAL SUPPLY



ROPE LAYERS AND WINCH CAPACITY VEHICLE ELECTRICAL SYSTEM

The maximum operating capacity of a winch is directly affected by the number of rope wraps on the drum. To maximise mechanical advantage during a recovery, as much rope as possible should be spooled off the drum before applying the recovery load.

Winch pull ratings are based on the rope being on the bottom (first) layer of the drum. As additional layers build up, the effective pulling capacity decreases.

Please note that maximum drum loads cannot typically be sustained for extended periods on most electric winches. For prolonged winching operations, the applied load should be significantly lower than the winch's rated capacity on the first layer.

In such cases, the use of a pulley system, such as RED Winches' Snatch Rings or Pulley Blocks, can improve mechanical advantage and reduce strain on the winch.

It is essential to understand how much power your winch draws from the vehicle's battery. Before installation, determine the winch's power requirements and ensure they are within the maximum output your vehicle's electrical system can deliver.

Always use correctly sized power cables. Undersized cables can starve the winch motor of current, increase electrical resistance, and may lead to motor failure. Ensure that earth (negative) cables are the same size as the positive cables to maintain proper balance in the system.

Keep in mind that a battery discharges faster than it can recharge. To help maintain charge levels:

- Increase engine revs while winching, and consider raising revs between winch operations.
- Most vehicles achieve maximum alternator output at around 1,800 rpm.

Never winch with the engine off, as this will rapidly discharge the battery and may leave you unable to restart the vehicle.

WINCH ROPE



The lifespan of a synthetic rope can be significantly extended through good working practices and regular maintenance.

Synthetic ropes should be inspected frequently for signs of damage, we recommend that ropes are checked before every use.

In the UK, under PUWER (Provision and Use of Work Equipment Regulations), winch ropes used in commercial or work settings must be inspected at least every six months.

Always follow the manufacturer's guidelines for care, inspection, and replacement intervals.

HANDLING GUIDELINES

Avoid Overloading or Shock Loading

Do not overload or shock load the rope. Shock loading, defined as a sudden load exceeding the recommended limit by 10%, can cause internal, invisible damage that may lead to rope failure.

Bending Radius

Avoid bending the rope around a radius smaller than six times its diameter.

Example: 9 mm rope $\times 6 = 54$ mm minimum bend radius.

Cleaning and Maintenance

To prolong rope life, keep it clean and dry.

Do not use a pressurised hose, as it may drive abrasive material into the fibres.

Instead, remove the rope and wash it in a container of cold water. Allow it to dry fully before reloading it onto the drum.

Chemical Exposure

Avoid direct contact with chemicals and their fumes, as these can degrade synthetic rope fibres.

UV Protection

When not in use, protect the rope from ultraviolet (UV) exposure by fitting a winch cover.

Heat Exposure

Synthetic ropes are susceptible to heat damage, especially from an overheated drum. Monitor drum temperature during prolonged or heavy use.

Winching Out Under Load

Do not winch out under load if using an electric winch that features an enclosed overrun brake within the drum. This can generate excessive heat and damage the rope.

Avoid Ground Contact

Where possible, prevent the rope from coming into contact with the ground.

Do not step on the rope, as this can embed dirt or grit into the fibres, accelerating wear.

Rope Identification and Inspection

Each rope should be clearly marked with a unique identification number.

Maintain a log of usage and inspections, including all inspection dates and any issues found.

CARE & INSPECTION

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ROPE INSPECTION GUIDELINES

Routine Inspection

RED Winches recommends inspecting the winch rope before every use.

Commercial Use – PUWER Compliance

In all commercial applications, ropes must be inspected every 6 months in accordance with PUWER regulations. Always refer to the Manufacturer's Guidelines.

Inspection Procedure

Inspect the entire length of the rope. It is normal for the outer fibres to become fluffy during regular use. Look for inconsistencies, including:

Lumps, Bumps, Flat spots.

These may indicate shock loading. If found, the rope must be destroyed. Assess the internal fibres by gently opening out the rope. The presence of powdered fibre is a sign of internal wear.

Winch Equipment Compatibility

If the winch or associated equipment has previously been used with wire rope, check for sharp or rough surfaces. Any such areas should be lightly sanded smooth to prevent damage to synthetic rope.

Damage Criteria

Ropes with 25% or more broken fibres should be destroyed. For 12-strand ropes, if two or more adjacent strands are cut, the rope must be destroyed. Rope can suffer from invisible damage, particularly due to heat or internal wear.

Heat Damage

Heat from an overheated drum or friction can significantly reduce rope strength without visible signs. Any suspicion of heat damage should result in the rope being destroyed.

Chemical and UV Damage

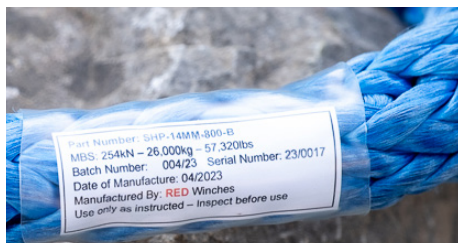
Exposure to chemicals or UV light may cause discolouration. If the rope is brittle or stiff in affected areas, determine the cause and destroy the rope if integrity is compromised.

Rope Records

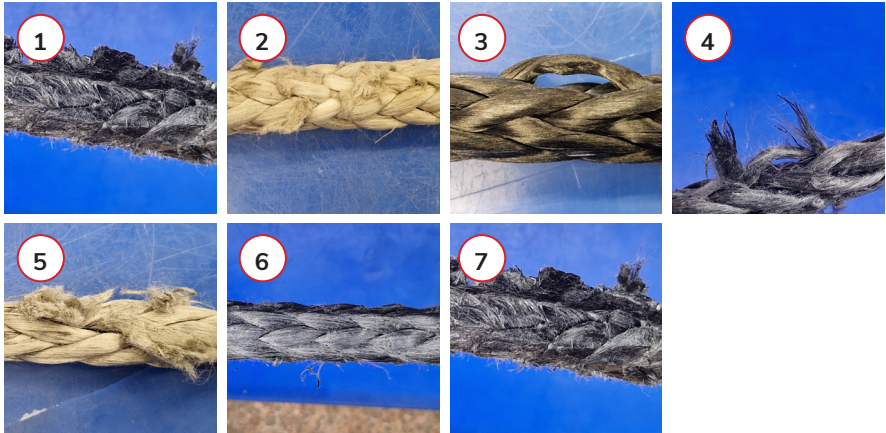
Always keep a detailed log of the rope's history, including inspections and incidents. If in any doubt about the rope's condition, destroy it immediately.

Emergency Repairs

Synthetic rope can be spliced. In an emergency, it is possible to cut out the damaged section and re-splice the rope. This should only be considered a temporary repair—the rope must be destroyed and replaced as soon as possible.



WINCH ROPE ASSESSMENT



1) Rope prior to use

2) Rope displaying 25% reduction from abrasion

3) Full volume Rope Strand

4) Strand reduced by 25% abrasion

5) Rope displays two adjacent cut strands. This rope should be destroyed. In an emergency, the damaged section can be removed and the rope re-spliced. However, this should be seen as a temporary repair. The rope should then be destroyed as soon as possible.

6) This rope is showing signs of compression. If the rope is manipulated, it should return to its original state. This should not be confused with a rope affected by heat.

7) This rope has been exposed to extreme heat. Unlike the compressed rope, it will not return to its original state if manipulated. This rope should be destroyed. In an emergency, the damaged section can be removed and the rope re-spliced. However, this should be seen as a temporary repair. The rope should then be destroyed as soon as possible.

WINCH ROPE SPECIFICATIONS

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	Wire 8mm	Wire 9mm	Synthetic Plasma 11mm
Estimated Breaking Load	4110Kg	5753Kg	9525Kg
Factor of Safety	2:1	2:1	2:1
Safe Working Load	2055Kg	2876Kg	4762Kg

> Advantages/Disadvantages

Wire Rope	Synthetic Rope
Not affected by heat	Critical temperature 65° C Melting Point 140° C
Wire rope is heavy and can be difficult to handle	Easy to handle, lightweight, reduces sprung mass over vulnerable area over front axle
Difficult to load, if tension is released wire will "birds nest" on drum	Easy to load. Does not "birds nest".
Low priced	Expensive
Sustains little damage from abrasion	Easily affected by abrasion
Will recoil if breaks under tension	Stores less energy than wire rope, but can still recoil dangerously if a tree strap fails under tension.
Not affected by most solvents or chemicals	Can be affected by some solvents and chemicals
Impossible to repair successfully at full strength reducing kinks	Easy to repair by splicing (In emergency only)
Wires can splinter and cause snags Does not splinter and causes snags	Does not splinter and cause snags
Wire rope must not be cross layered	As long as shock loads are avoided, the rope can be cross-layered without risk of damage.
More resistant to mishandling	Mishandling may cause damage

SAFETY GUIDELINES



General Operating Safety

- **Read All Product Literature:** Familiarise yourself with the manual and all safety instructions before use.
- **Know Your Winch:** Understand its capabilities and limitations.
- **Wear Suitable Gloves:** Always use protective gloves when handling the winch rope.
- **Use the Supplied Equipment:** If provided, always use the manufacturer-supplied hook or soft loop.
- **No Improvised Use:** Never use the winch as a hoist.
- **Not for Load Securing:** Do not use the winch to secure loads in transit.
- **Do Not Tow with Winch:** It is not designed to absorb towing shock loads.
- **Stay Sober:** Do not operate under the influence of drugs, alcohol, or medication.
- **Age Limit:** Operators must be 16 years or older.



Installation Safety

- **Mount Securely:** Choose a mounting location that can handle the winch's full pulling capacity.
- **Correct Fasteners Only:** Use Class 8.8 metric (Grade 5) or stronger bolts
- Never weld mounting hardware.
- **Install Mechanically Before Wiring:** Complete winch and hook installation before connecting electrics.
- **Fairlead Alignment:** Ensure correct positioning to avoid rope abrasion, the

fairlead is a pinch point.

- **Keep Hands Clear:** During installation, operation, and spooling, keep hands away from rope, hook, and fairlead.
- **Pre-Stretch Rope:** Re-spool under load before first use to prevent binding.
- Never route electrical cables across:
 - Sharp edges
 - Hot surfaces
 - Moving parts
- Always use terminal boots and use appropriate sheathing
- Never lean over the battery during connection.
- Never short battery terminals or place tools across terminals.



Pre-Operation Checks

- **Inspect Before Use:** Check rope, hook, slings, and fasteners. Replace damaged components immediately.
- **Anchor Strength:** Ensure the anchor can withstand the load. Use correct rigging.
- **Clear Work Area:** Remove obstructions and keep bystanders clear of the winching zone.
- **Use Correct Hooking Techniques:** Never hook the rope back onto itself, use a recovery strap.



Operating Procedures

- **Use Safe Rigging Techniques:** Take time to rig correctly and spool out as much rope as possible.
- **Maintain Vehicle Stability:** Monitor vehicle/ load during operation.

SAFETY GUIDELINES

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- Always seat the load in the throat of the hook.
- Never apply load to the hook tip or latch.
- Always use a hook with a safety latch.
- Never use a damaged hook.
- Hot Surface Hazard: Avoid contact with hot components during or after winch operation.

Avoid Winch and Equipment Damage

- Avoid side pulls — rope can pile up and damage winch or drum.
- Do not damage vehicle frame when anchoring.
- Avoid off-centre pulls to prevent rope pile, up and equipment damage.
- Avoid continuous pulls at extreme angles to prevent jamming.



Hazard Warnings

Falling or Crushing Hazard – Risk of Serious Injury or Death

- Always stand clear during operation; keep hands and others away.
- Never operate with fewer than 6 wraps of rope on the drum, the rope may detach.

Moving Parts Entanglement Hazard – Risk of Serious Injury or Death

- Never leave the remote (wired or wireless) connected or powered during free spooling or rigging.
- Always disconnect wireless controls when not actively operating the winch.
- Remove jewellery.

NOMAD ACCESSORIES

PREMIUM

ADVENTURE RECOVERY KIT

A comprehensive, heavy-duty recovery kit designed for serious off-roaders using winches up to 6,000kg (13,250lbs). Includes premium RED Winches components with a 2:1 or greater safety factor. Save over 25% compared to buying items individually.



MILSPEC HAND CONTROLLER

designed for those who prefer a wired solution without compromising on durability and functionality. With several upgrades, this military-spec hand controller is built to withstand the toughest conditions while providing reliable performance.



ADVENTURE WINCH KIT

Built for serious off-road and expedition use, offering a complete, high-performance solution for vehicles equipped with winches up to 6,000kg (13,250 lbs). Each component in the kit is engineered and selected to ensure a minimum 2:1 factor of safety, delivering the strength, reliability, and peace of mind.



AIR FREESPOOL KIT

designed for those who prefer a wired solution without compromising on durability and functionality. With several upgrades, this military-spec hand controller is built to withstand the toughest conditions while providing reliable performance.



WINCH LOADINGS

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Rolling Resistance Table

	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5
Road	40	60	80	100	120	140	160	180	200	220	240	260	280	300
Grass Dry Ground	143	214	286	357	429	500	571	643	714	786	857	929	1000	1071
Grass Wet Ground	250	375	500	625	750	875	1000	1125	1250	1375	1500	1625	1750	1875
Gravel	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
Shingle	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
Mud	333	500	667	833	1000	1167	1333	1500	1667	1833	2000	2167	2333	2500
Wet Sticky Mud	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750

Vehicles Bugged Down in Mud (Casualty Weight Limit: X tons / X,000 kg)

	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5
Axle	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500
Wheel Tops	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000	14000	15000
Bonnet	3000	4500	6000	7500	9000	10500	12000	13500	15000	16500	18000	19500	21000	22500

Damage Resistance Table (4-Wheeled Vehicles Only – Casualty Weight in Tons, 1 ton = 1000 kg)

No. Of Damaged Wheels	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5
1	250	375	500	625	750	875	1000	1125	1250	1375	1500	1625	1750	1875
2	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
3	750	1125	1500	1875	2250	2625	3000	3375	3750	4125	4500	4875	5250	5625
4	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500

Gradient Resistance Table Casualty Weight in Tons (1 ton = 1000 kg)

Slope Degrees	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5
10	167	250	333	417	500	583	667	750	833	917	1000	1083	1167	1250
20	333	500	667	833	1000	1167	1333	1500	1667	1833	2000	2167	2333	2500
30	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750
40	667	1000	1333	1667	2000	2333	2667	3000	3333	3667	4000	4333	4667	5000
45	750	1125	1500	1875	2250	2625	3000	3375	3750	4125	4500	4875	5250	5625
50	833	1250	1667	2083	2500	2917	3333	3750	4167	4583	5000	5417	5833	6250
60	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500



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