



HYDRAULIC WINCH

TORO2200Q



1689 Xianyuan Road, Jinhua, Zhejiang, China
Tel: 0086-579-82262697
Fax: 0086-579-82262706
<http://www.novawinch.com>
E-mail: info@nowvow.net

PLEASE READ CAREFULLY BEFORE OPERATE THE WINCH



202312

Gearbox Assembly	34	Hexagon socket screw M8*70	12
	35	Spring washer φ8	12
	36	Hexagon socket screw M6*30	6
	37	Spring washer φ6	6
	38	Plain washer φ6	6
	39	Hexagon socket screw M12*1.5	2
	40	Sealing gasket set12	2
	41	O-ring φ30*3.1	1
	42	Gear box cover	1
	43	O-ring19*1.8	1
	44	Locking Screw	1
	45	Hexagon socket button head screws M4*10	4
	46	Spring washer φ4	4
	47	Hexagon socket screw M10*25	1
	48	Spring washer φ10	1
	49	Shaft sleeve	1
	50	1st stage gear ring	1
	51	Gearbox housing	1
	52	Retaining Rings for holes	1
	53	Gear shaft	1
	54	Oil sealing	1
	55	Slide bearing	1
	56	2nd planetary gear assembly	1
	57	1st planetary gear assembly	1
	58	1st sun gear	1
	59	Taper pins	3
60	O-ring	1	
61	2nd stage gear ring	1	
62	Gear box frame	1	
63	O-ring	1	
64	Shaft sleeve	1	
65	O-ring 1	1	
66	Cylinder	1	
Tensioner	67	Tensioner	1
Hardware	68	Hardware	1

TOR022000Q

Assembly	Item	Description	Qty
Hydraulic Brake	1	Motor frame	1
	2	Stopping washer	1
	3	Disc spring	2
	4	Pressure plate	1
	5	Sationary disc	5
	6	Rotating disc	4
	7	Supporting ring M16	2
	8	Drive shaft couplings	1
	9	Y-seal ring	1
	10	Motor mounting plate	1
	11	Hexagon socket screw M8X30	8
	12	Flat washer ϕ 8	8
	13	Spring washer ϕ 8	8
Hydraulic Motor And Valve	14	Hexagon socket bolt M8X30	4
	15	Spring washer ϕ 8	4
	16	Valve	1
	17	M7 bleed nipple	1
	18	Hydraulic motor	1
	19	Connection for oil hose	1
	20	Hexagon socket bolt M12X30	2
	21	Spring washer ϕ 12	2
	22	Oil Tube	1
Drum Assembly	23	Hexagon socket screw M16*35	8
	24	Spring washer ϕ 16	8
	25	Plain washer ϕ 16	8
	26	Tie bar	2
	27	Hexagon socket set screws with flat point M8*8	1
	28	Deep Groove Ball Bearing	1
	29	V Sealing	1
	30	Drum	1
	31	Anti-wear pads	1
	32	Needle bearing	1
	33	V Sealing	1

Safety Warnings and Precautions

WARNING: When using the winch, basic safety precautions should always be followed to reduce the risk of personal injury and damage to the equipment. Read all this instructions before using this winch!

1.Keep children away. Children must never be allowed in the work area. Do not let them handle machines, tools, or extension cords.

2.Store idle equipment. When not in use, tools must be stored in a dry location to inhibit rust. Always lock up tools and keep out of reach of children.

3.Dress properly. Do not wear loose clothing or jewelry as they can be caught in moving parts. Protective, electrically non-conductive clothes and non-skid footwear are recommended when working. Wear restrictive hair covering to contain long hair.

4.Use eye and ear protection. Always wear impact safety goggles. Wear a full face shield if you are producing metal fings or wood chips. Wear a dust mask or respirator when working around metal, wood, and chemical dusts and mists.

5.Maintain tools with care. Keep tools sharp and clean for better and safer performance. Follow instructions for lubricating and changing accessories. Inspect tool cords periodically and, if damaged, have them repaired by an authorized technician. The handles must be kept clean, dry, and free from oil and grease at all times.

6.Disconnect switch. Unplug switch when not in use.

7.Stay alert. Watch what you are doing, use common sense. Do not operate any tools when you are tired.

8.Check for damaged parts. Before using any tool, any part that appears damaged should be carefully checked to determine that it will operate properly and perform its intended function. Check for alignment and binding of moving parts; any broken parts or mounting fxtures; and any other condition that may affect proper operation. Any part that is damaged should be properly repaired or replaced by a qualifed technician. Do not start the winch if switch does not turn ON or OFF properly.

9.Replacement parts and accessories.When servicing, use only identical replacement parts. Use of any other parts will void the warranty. Only use accessories intended for this winch.

10.Do not operate winch if under the influen of alcohol or drugs. Read warning labels on prescription to determine if your judgment or refxes are impaired while taking drugs. If there is any doubt, do not operate the winch.

Winch Warnings and Precautions

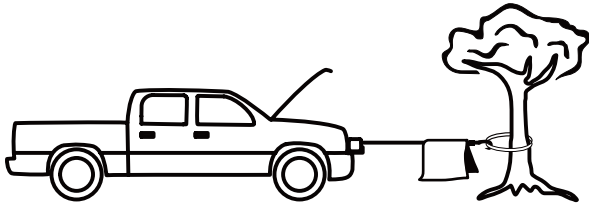
1.Keeps hands and body away form fairlead (cable intake slot) when operating.

2.Secure vehicle in position before using winch.

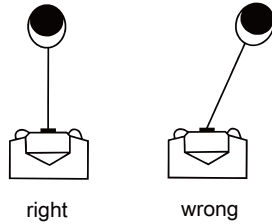
3.Be certain winch is properly bolted to a structure (or vehicle) that can hold the winch load.

4.Do not use inappropriate attachments to extent the length of the winch cable.

5. Never lift people or hoist loads over people.
6. It is important that lay a blanket or jacket over the wire rope near the hook end when pulling a loads .
This will slow the snap back of a broken wire rope and help to prevent serious injure and damage.



7. Avoid continuous pulls from extreme angles because this will cause the wire rope to pile up on one end of the drum and damage the wire rope.
8. Never come in between the winch and the load when operating.
9. After moving an item with the winch, secure the item. Do not rely on the winch to hold it for an extended period.
10. Examine winch before using. Components may be affected by exposure to chemicals, salts, and rust.
11. Never fully extent cable while under load. Keep 5 complete turns of cable around the winch drum.
12. Never operate winch if cable shows any sings of weakening, knotted or kinked.
13. Winch does not have a locking mechanism. Secure load after moving.
14. Do not cross over or under cable under load
15. Do not move vehicle with cable extended and attached to load to pull it. The cable could snap.
16. Use gloves while handling cable.
17. Apply blocks to vehicle when parting on an incline.
18. Re-spool cable properly.



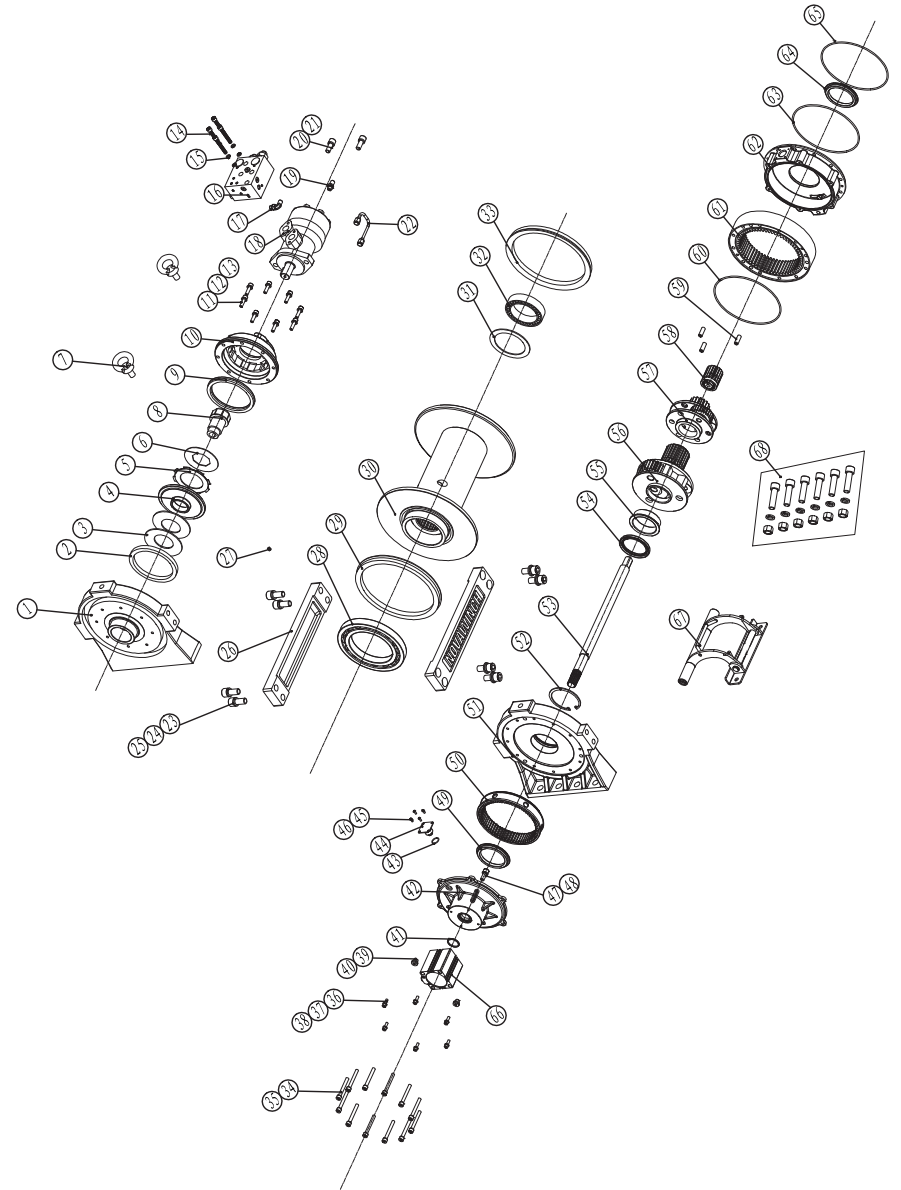
Unpacking

When unpacking, check to make sure all parts is included. Refer to Winch Assembly Drawing and Parts List (both with respective item numbers) at the end of this manual.

Installation

1. Mount clutch handle to the clutch assembly , screw as tight as possibly by hand.
2. Mount winch to the vehicle by using high strength cap screw. It should be aligned and secured to a solid part of the vehicle (front or rear) where the full rated load will be evenly distributed.
3. Connect the two-color (positive) battery cables form the female connector to screw-down positive (+) terminal of the 12/24V battery.
4. Please refer to installation illustration.

TORO 22000Q Winch Assembly Drawing



TORO22000Q winch performance specifications	
Rated line pull	22000lbs(9979kg)
Gear rat	22.67:1
Max Flow	75L/min
Max pressure	16.5MPa
Motor displacement	194ml/r
Wire rope	80/127"×137' (Φ16mm×42m)
Drum size	5.4"×11.8" (138×300mm)
Overall Dimensions	33.7"×15"×15" (856×382×382mm)
Bolt pattern	17"×2.5"(431×64mm) 17"×7.5"(431×192mm)
Net Weight	276lb(125kg)

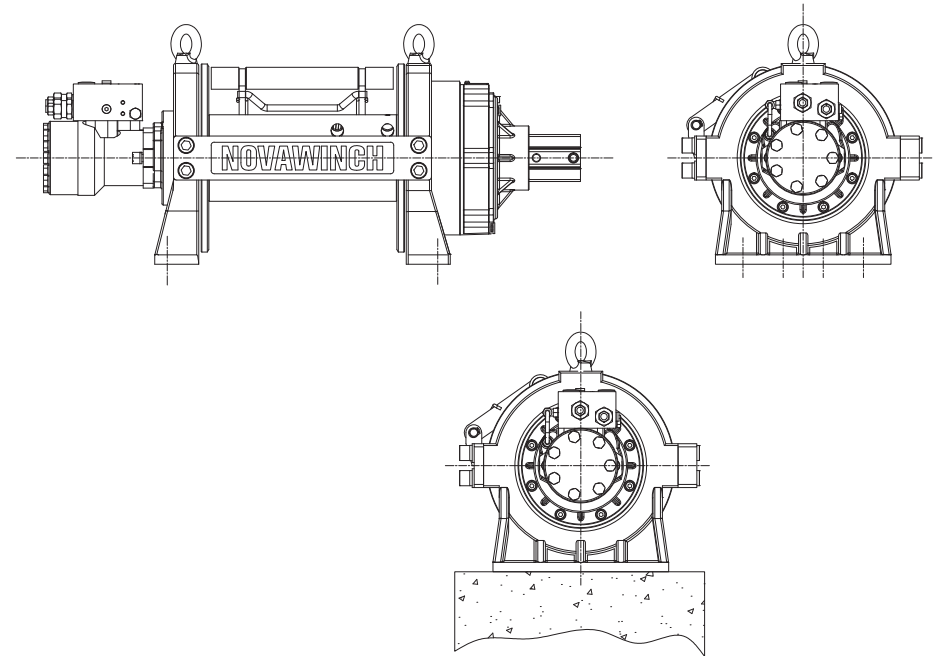
22000LB winch Line pull and pressure difference						
Single line pull	lbs	0	8000	12000	15000	22000
	kg	0	3632	5448	6810	9979
Pressure difference between motor entry and exit	Mpa	6	7	10	12	18

22000LB winch line pull and cable capacity					
Layer of cable		1	2	3	4
Rated line pull per layer	lbs	22000	18578	16077	14170
	kg	9979	8425	7291	6426
Cable capacity per layer	Ft.	31.2	68.2	110.9	137
	m	9.5	20.8	33.8	42
Line Speed	Ft/min	23	27	31	36
	m/min	7	8.3	9.6	10.9

MOUNTING

The diagrams show the mounting dimensions for the 22000 LB.

The side and feet mounting hole positions are designed to allow the winch to be interchangeable with the most popular 22000 LB unit scurrently available. The diagram below shows the 22000 LB mounted on a flatbe mounting kit , shown with Roller Fairlead. If a mounting plate is is not used, the surface must be fla within 0.5 mm and sufficientl stiff to prevent fixing. A minimum of 6.0 mm thick steel plate should be used. The thicker the plate, the better the alignment between motor mounting, drum and gearbox housing. It is important that the winch is mounted securely so that the motor mounting, drum and gearbox housing are accurately aligned. Be sure the winch will not move under load, otherwise you may cause misalignment in the winch, causing the drum to bind up. The tie bars supplied with the winch must remain attached when the winch is foot mounted. Angle mounting is possible and recommended for maximum flxibility in mounting. These mounts allow the winch to be low-mounted. See the diagram below.



Mounting the directional solenoid valve assembly:

The valve should be mounted away from any areas where heat may be considered too extreme. Such as an exhaust manifold or turbo. Be sure all plumbing and wiring reaches from the area is selected without being stressed. It may be mounted by using the bracket and Allen screws supplied. Using the bracket as a guide, mark the location of where the mounting holes are going to be drilled, remove the plate and drill four 1/4 holes. Mount valve assembly using nuts, bolts.

Note: On some vehicles grill may have to be removed to install plumbing and wiring for the winch.

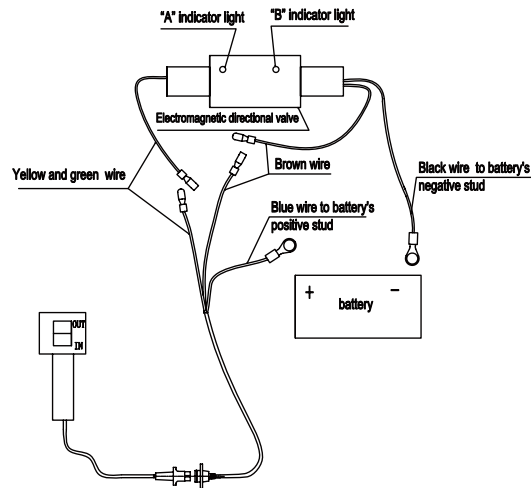
Mounting the balance valve:

The balance valve you obtained (it's optional) is simply connected to motor. If your winch system installs a balance valve as complete working mode, be sure the balance valve's installing direction meets hydraulic principle chart. Otherwise, the winch will not reach the rated line pull, and it is also dangerous for winch to power off the cable with heavy load. If this symptom happens, simply disconnect the balance valve, exchange the oil hole between hydraulic motor and balance valve, and reconnect it. If your ordered, the balance valve should be supplied. It will have been connected with the motor at the factory.

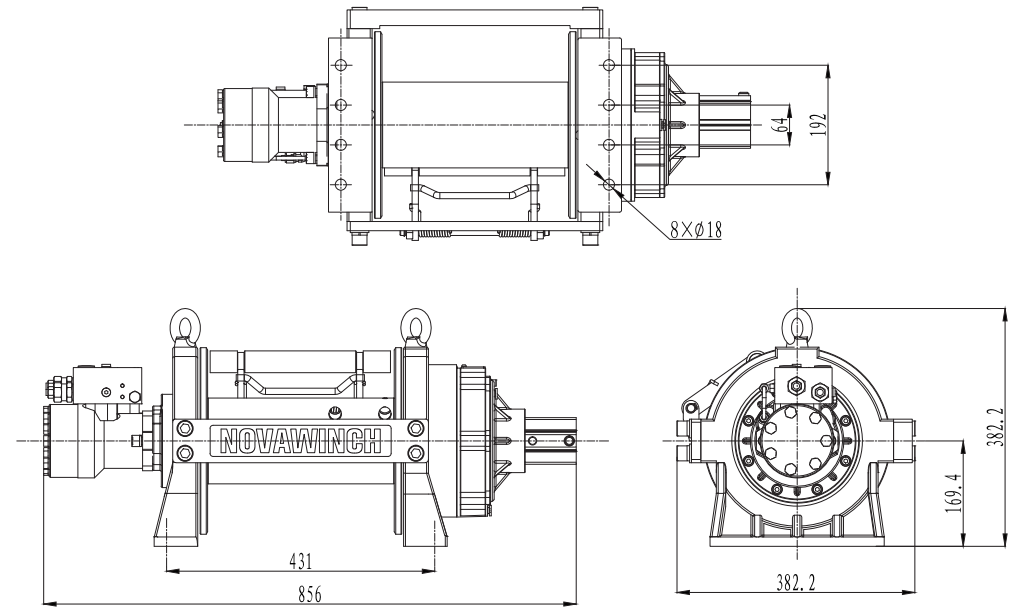
Electrical connections:

If winch's power supply is from the vehicle's exiting power steering pump, the solenoid valve system is designed default to the power steering box so power steering is always available even when the winch is in use. The power source to the solenoid is not energized until the three-pole quick connector plug is plugged in. Each solenoid has two wires----either of which can be used as a ground or for electric power. The grounds are connected to each other at the factory. The other will connect to the blue and yellow wire in the harness (see illustration). Determine a location on the

front grill to mount the female 3 pole plug connector. Drill a hole and mount the female 3 pole plug connector using nuts, bolts and washers supplied. Connect all wiring as shown in illustration. Test hand control unit, solenoids will make a slight click sound if connected properly.



TORO22000Q



	-Insufficient fluid in the system.	balance valve. -Check fluid level. And fluid until full.
The switch assembly working in backwards	-Electrical connections are in working direction.	-Simply exchange the blue and yellow wire connectors at the solenoid of directional valve.

Lubrication

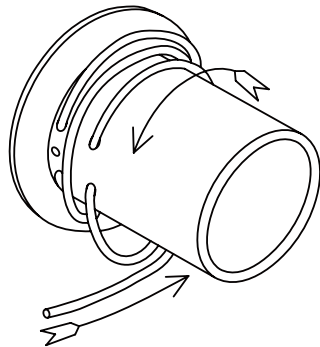
1. All moving parts within the winch having been lubricated using high temperature lithium grease at the factory. No internal lubrication is required.
2. Lubricate cable assembly periodically using light penetrating oil.

Cable Assembly Replacement

1. Turning clutch to the Clutch Out position.
2. Extend cable assembly to its full length. Pay attention to how the existing cable is connected to the drum.
3. Remove old cable assembly and attach new one.
4. Retract cable assembly onto drum, first five wraps being careful not to allow kinking then winch cable must be wound onto the drum under a load of at least 10% rate line pull.
5. The roller fairlead is to be mounted so as to guide the rope onto the drum evenly.

Pulling out the rope

Dis-engage the freespool. With a pair of gloves on, pull out the rope and secure to anchor or load. Re-engage the freespool.



Plumbing connections

Keep all hoses away from any areas where heat may be considered too extreme such as an exhaust manifold or turbo. Lines should not be allowed to rub on any abrasive or vibrating surfaces. In some applications, right angle fitting on the directional valve and motor or balance valve are necessary to make hose mounting more flexible. After plumbing has been laid out on vehicle, install o-ring fitting supplied to valve. Torque tight. DO NOT OVERTIGHTEN ANY FITTINGS. Install o-ring fitting on winch motor. Torque tight. Connect any hose port A on motor or port C1 on balance valve to port A on directional valve, port B on motor or port C2 on balance valve to port B on directional valve, port P on directional valve to pump's high pressure port, port T on valve to reservoir. Attach any o-ring or seal from vehicles original tube fitting to tube fitting

HYDRAULIC SYSTEM REQUIREMENTS

Refer to the performance charts below to properly match your hydraulic system to the winch performance. A motor spool directional control valve is recommended.

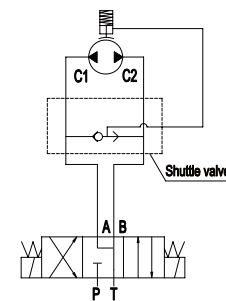
TORO22000Q

SYSTEM REQUIREMENTS:
 2500 PSI RELIEF VALVE SETTING
 20 G.P.M. FLOW RATE *
 10 MICRON NORMAL FILTRATION

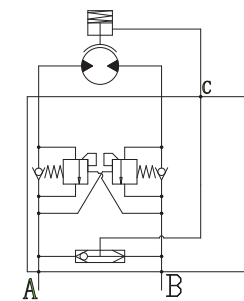
*Caution: Do not exceed 20 G.P.M. If exceeded, motor and winch may be damaged.

Working hydraulic principle chart:

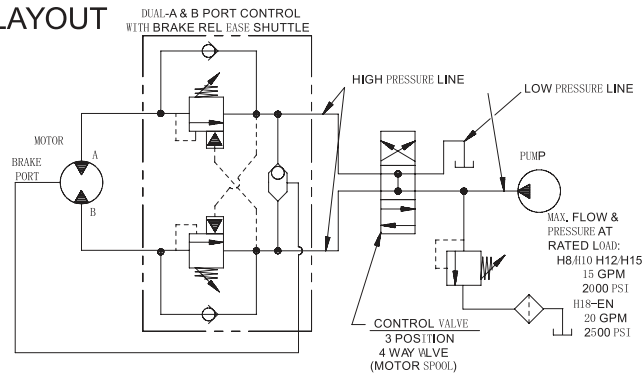
WITHOUT LOAD CONTROL



WITH LOAD CONTROL



TYPICAL LAYOUT



Caution:

Battery cables should not be drawn taut, leave slack for some cable movement.

If your application is supplied with an added cooler, please refer to illustration. Check fluid level. Replace lost fluid to system. System will need to be purged. Start engine. Power winch cable in 5 feet. Shut engine off. Check fluid level. (Add fluid until full, start engine, power winch cable, Out 5 feet. Shut engine off. Check fluid level.) Add fluid until full if necessary. Start engine. Power winch cable into desired position. Turn vehicle wheels from lock to lock position 5 times. This will aid in bleeding out any air that may have got into the system.

If the hand control unit is working backwards, simply exchange the brown and white wire connectors.

Winch cable must be wound onto the drum under a load of at least 10% rated line pull or outer wraps will draw into inner wraps and damage winch cable.

Test winch for proper operation. Refer to the operation section below.

WARNINGS!

1. Make sure the clutch is totally engaged before starting any winch operation;
2. Stay clear and away from raised loads;
3. Stay clear of cable while pulling do not try to guide cable;
4. A min. of wraps of cable around the drum.

General information

The winch's standard equipments contain gear reducer, pump, hydraulic motor, solenoid valve, switch assembly, female connector and plumbing fittings. The winch obtains its pressure from the vehicle's existing power steering pump or other hydraulic power. The winch is totally sealed, can be used underwater. There are several ways to supply the pressure for winch. The first way: use an individual pump for engineering use; the second way: the winch's pressure is from the vehicle's existing power steering pump as

installation illustration: ① Use a suitable individual pump which has not oil valve. It supplies pressure for both steering box and winch. ② Use a combined pump which integrate an oil valve together. The oil valve supplies two kinds of flow for different demands, one with constant flow is for steering use, the other with higher power is for engineering use. Refer to installation. You can choose the best suitable way. If your winch installed as a simple working mode (standard supplied), NEVER POWERWINCH CABLE OUT WITH HEAVY LOAD, that will be serious dangerous. If your winch installed a balance valve as a complete working mode, you can power winch cable in and out under heavy load even lifting.

1. Disengage the clutch by turning the clutch to the out position.
2. Grab the Cable and hook assembly and pull the cable to the desired length, then attach to item being pulled.

Caution: always leave at least five turns of cable on the drum. Review winch Safety Warnings and Precaution before continuing.

3. Reengage the clutch by turn the clutch to the in position. If necessary to turn the drum make a slight click sound while engaged properly, then finger the clutch tight.
4. Lift the female connector cover exposing the electric switch connector.
5. Insert the switch assembly connector on to the female connector.
6. While standing aside of the towing path, press (and hold) the push button on the switch assembly. Press (and hold) the opposite push button to reverse directions. Wait until the motor stops before reversing directions.
7. When the towing is complete remove the switch assembly. From the female connector and replace the female connector's cover.

Maintenance

It is highly recommended and that the winch be used regularly (once a month). Simply power the cable out 15m, free spool 5m and then power back in. This will keep all components in good working condition so that the winch can be relied on when needed. Contact your authorized outlet for technical assistance and repairs.

Trouble shooting

SYMPTOM	POSSIBLE CAUSE	SUGGESTED ACTION
Winch does not turn	-Electrical connections have not connected properly	-Insert switch assembly all the way into connector. -Tighten nuts on all cable connections
Motor runs but cable drum does not turn	-The clutch is not engaged	-Turn the clutch to the CLUTCH IN position. If problem still exists, a qualified technician needed to check and repair.
Winch drum runs slowly or without normal power	-Insufficient pressure or oil flow -Balance valve connected with wrong direction.	-Bump is not suitable or defective. Change a new one or a suitable one. -Disconnect the balance valve; exchange the oil hole between hydraulic motor and