Operating and Maintenance Manual

Planetary Winch

This manual MUST be kept with the winch at all times. New winch operators MUST read and understand the contents fully.
FAILURE TO HEED THE FOLLOWING WARNINGS MAY RESULT IN SERIOUS INJURY OR DEATH!

- Do not use to lift or move people. If your task involves moving or lifting people, you must use the proper equipment, not this winch.

- Winch operators must be trained in the proper, safe operation of the winch.

- Cable anchors on Tulsa Winches are not designed to hold the rated load of the winch. You must keep at least five (5) wraps of cable on the drum to insure that the cable doesn't come loose.

- Stay clear of suspended loads and of cable under tension. A broken cable or dropped load can cause serious injury or death.

- Make sure that all equipment, including the winch and cable, is maintained properly. Pay especially close attention to the clutch, making sure that it fully engages when shifted. Do not attempt to disengage the clutch when a load is on the winch.

- Avoid shock loads. This type of load imposes a strain on the winch many times the actual weight of the load and can cause failure of the cable or of the winch.
INTRODUCTION

Thank you for purchasing a new Tulsa Winch. We are proud of our products and are certain that they will perform your winch tasks properly. However, we do ask that you take a few minutes to read and thoroughly understand this booklet. Also, if you have new operators assigned to the winch, make sure that they read and understand it. Because of the large number of models we manufacture, we are unable to show parts lists for every model in this booklet. If you want or need parts lists, please write Tulsa Winch, 11135 S. James, Jenks, OK 74037. Or call (918) 298-8300 or fax us at (918) 298-8367. You may also go to our Web site at www.team-twg.com.

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GENERAL OPERATION

1. Be sure to read all safety instructions thoroughly. It is important that each operator is aware of the consequences of misuse or poor operating practices of this winch.

2. Tulsa Winch products are not to be used to lift, hoist, or move people. If your application requires moving persons, you must use the proper equipment for the task.

3. Cable anchors on Tulsa Winch products are not designed to hold the rated load of the winch. You must keep at least five (5) wraps of cable on the drum to insure that the cable does not come loose.

4. Personnel must stay clear of a suspended load or any line under load. A distance of 1-1/2 times the length of the cable should be maintained while the cable is under tension. Failure to heed this warning may result in serious injury or death.

5. Make sure that all equipment is maintained properly and regular systems checks are performed to insure your winch is working safely. Refer to the maintenance section of this manual for details on these procedures.

6. Avoid shock loads. This type of load imposes a strain on the winch many times the actual weight of the load and can cause failure of the cable or of the winch.

7. Always inspect cable before beginning job. Never allow cable to slide through hands while maintaining tension, use hand-over-hand method to keep cable tension while spooling. Always use leather gloves when handling cable.
THEORY OF OPERATION

1. The Tulsa Planetary Winches are composed of an input from either a high torque, low speed geroler motor or a high-speed gear or piston motor. Input drives through a multiple disc brake that is spring applied and hydraulically released, and then through planet gear sets to the cable drum.

2. During inhaul, the brake is not released since the load is driven through a one-way cam clutch, bypassing the brake. When the load comes to a stop, the cam clutch locks up and the load is prevented from moving by the brake.

3. During payout, a brake valve is used to prevent the load from moving faster than desired. This brake valve partially blocks the main line from the motor back to the directional control valve, allowing only a limited amount of oil through the motor. Also, any time there is sufficient pressure to modulate the brake valve, this same pressure releases the multiple disc brake.

USING A SNATCH BLOCK

By using a snatch block you have effectively cut the load on the winch in half. A snatch block should be used any time you have a concern about the ability of the winch or cable to move a load. The following illustration shows one way to rig such a block.
CABLE CONSIDERATIONS

As the number of layers of cable on a winch increases, the rated capacity of the winch goes down. If you are operating at near the top of the drum flanges, the effective rating of the winch is about half of what it is on the first layer. You should therefore, only keep as much cable on the winch as you need for your job.

Never use larger or smaller cable on your winch than is recommended for it. The use of larger cable will not allow you to pull larger loads and may, in fact, break easier than the proper size cable. The use of smaller cable may overheat the winch due to increased running time with more cable.

The following chart shows the recommended cable sizes for Tulsa Winches

<table>
<thead>
<tr>
<th>Winch Model</th>
<th>Cable Size</th>
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<tbody>
<tr>
<td>506W</td>
<td>7/16”</td>
</tr>
<tr>
<td>707W</td>
<td>1/2”</td>
</tr>
<tr>
<td>1200W</td>
<td>9/16”</td>
</tr>
<tr>
<td>1500W</td>
<td>5/8”</td>
</tr>
<tr>
<td>3541RL</td>
<td>3/4”</td>
</tr>
<tr>
<td>RN45P</td>
<td>3/4”</td>
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<tr>
<td>RN60P</td>
<td>7/8”</td>
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<tr>
<td>RN80P</td>
<td>1”</td>
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<tr>
<td>RN100P</td>
<td>1”</td>
</tr>
<tr>
<td>RN130P</td>
<td>1 1/4”</td>
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</tbody>
</table>

Consult your local cable supplier for recommendation on the best type of cable and hardware to use in your specific application.

WARNING: CABLE ANCHORS ON TULSA WINCHES ARE NOT DESIGNED TO HOLD THE RATED LOAD OF THE WINCH. YOU MUST KEEP AT LEAST 5 WRAPS OF CABLE ON THE DRUM TO INSURE THAT THE CABLE DOES NOT COME.
THE IMPORTANCE OF A PROPER FLEET ANGLE

Maintaining the proper fleet angle is important to the success of your winching operation, the life of your winch and the life of the cable you are using. The fleet angle can best be described by the following illustration.

The fleet angle should be kept as small as possible to insure proper spooling and to maximize cable and winch life. To promote even cable spooling, keep the fleet angle below three degrees. Whenever possible, spool through a block at the back of the truck body. Never pull directly against the flange of the winch cable drum as this may cause the cable or the winch to break.

If you are using a front mounted winch for vehicle recovery, use a snatch block to avoid pulling sideways on the winch. If your winch is equipped with a four way roller and you absolutely must pull against a side roller, do so only for as long as is necessary and carefully watch the cable on the drum. It will pile up on one side of the drum and you must insure that it doesn’t jump over the drum flange. When you are finished using the winch in a manner where the cable does not spool evenly, disengage the clutch and pay out the uneven cable. Then slowly re-spool the cable, making sure that it lays evenly.
CABLE INSTALLATION

To install the cable wedge anchor, first consult the wire rope manufacturer for recommendations on how to prepare the end of the wire rope. Thread the prepared end of wire rope through the smaller side of the opening of the cable drum wedge pocket. Pull through enough cable to loop it back around and insert the end back into the wedge pocket to about 3/4 depth. Install the wedge in the loop then pull the slack out of the loop with the working line. The wedge will slip into the pocket and secure the wire rope into the drum.

To install the u-bolt clamp style of anchor, first prepare the end of the cable as recommended by the wire rope manufacturer. Pass the wire rope through the u-bolt so that the end extends approximately 2x the diameter of the cable. Tighten the clamp evenly until the wire rope begins to deform slightly under the u-bolt and the cable is held securely.

WARNING: CABLE ANCHORS ON TULSA WINCHES ARE NOT DESIGNED TO HOLD THE RATED LOAD OF THE WINCH. YOU MUST KEEP AT LEAST 5 WRAPS OF CABLE ON THE DRUM TO INSURE THAT THE CABLE DOESN’T COME LOOSE.

Use extreme care when first spooling cable onto the winch. Do NOT run the winch at high speeds when performing this operation. Make sure that the cable is unrolled in a line (to prevent kinks) and slowly inhaul the winch to install the cable.
WINCH MOUNTING

You must make sure that your winch is securely mounted in order for it to function properly and to insure safe operation. The mount must be flat to insure proper alignment between the gearbox side, the drum, and the clutch.

A rule of thumb to use when selecting capscrews to mount the winch is to use the same size and number of capscrews to fasten the winch to its mount as we use to fasten the gearbox and end bracket to the winch frames. Winches must never be fastened directly to the frame of a truck; mounting brackets as shown below should be used.

All capscrews used to mount the winch should be Grade 8 or better and should be carefully tightened to the proper torque value for their size. All moving parts used to drive mechanical winches should be secure and guards used, if they are in accessible locations. If the winch being mounted is hydraulically driven, make sure the system is clean and that all components function properly, especially the relief valve.

<table>
<thead>
<tr>
<th>Model</th>
<th>No. of Capscrews</th>
<th>Size Capscrews</th>
</tr>
</thead>
<tbody>
<tr>
<td>506W</td>
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</tr>
<tr>
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<td>8</td>
<td>1 1/8&quot;</td>
</tr>
</tbody>
</table>

(USE MOUNTING HOLES PROVIDED IN BASE OF WINCH)
WINCH MAINTENANCE

A winch, like any other type of machinery, needs periodic maintenance and inspection to maintain its performance capabilities, give lasting value, and insure safe mechanical workings. Good maintenance consists of three steps.

1. A daily inspection to insure that there are no oil leaks present, that all mounting bolts and other fasteners are tight, and that wire rope is in good condition.

2. Periodic servicing of the winch includes changing the oil in both the gearbox and the brake section. Severity of use will determine the need for oil changes but it should be checked at a minimum of every 500 operating hours and changed every 1000 hours of operation. Factors such as extremely dirty conditions or widely varying temperature changes may dictate even more frequent servicing.

3. Complete teardowns and component inspections. Again, severity and frequency of use will determine how often this should be done. If the equipment on which this winch is mounted is subject to inspection standards, then those standards must also apply to the winch and be followed. If oil changes reveal significant metallic particles, then a teardown and inspection must be made to determine the source of wear.

LUBRICATION

1. Check gearbox oil levels weekly. If the oil level does not show a satisfactory amount, refill oil according to the individual winch manual.

2. Check brake oil level and fill or replace if oil shows significant metallic particles.

3. Lube all bushings equipped with grease zerks with a good quality lithium based chassis lube.

4. Lubricate the cable based on your wire rope supplier’s recommendations.
Tulsa planetary winches are shipped from factory with SAE 90 EP gear lube in the gearbox and SAE 20-20W motor oil in the brake section. This oil should be satisfactory for operation in ambient temperatures from -10° F to +110° F. If your work calls for operation in temperatures outside this range, contact Tulsa Winch for recommendations.

The hydraulic system driving the winch should use only high quality hydraulic oils from reputable suppliers. These oils should contain additives to prevent foaming and oxidation in the system. All winch hydraulic systems should be equipped with a return line filter capable of filtering 10-micron particles from the system.
BRAKE SYSTEM

The winch braking system is a multiple disc, spring applied hydraulically released setup that is activated via the port in the brake housing. During pay-in the brake is not released but bypassed through the one-way cam clutch. When the load comes to a stop, the cam clutch locks up and the load is prevented from slipping by the brake.

During payout, a brake valve is used to prevent the load from moving faster that desired. This valve partially blocks the main line from the motor back to the directional control valve, allowing only a limited amount of oil through the motor.
WINCH MODEL CODES
(After 01-01-03)

RN100 P H L X O A 1

Basic Model

Gear Type
W=Worm
P=Planetary

Drive Type
H=Hydraulic
M=Mechanical

Gearbox Position
L=Left
R=Right
(viewed from rear of truck)

Input Shaft Location
F=Front
R=Rear
X=Does not apply
(viewed from rear of truck)

Cable Spooling
O=Over Drum
U=Under Drum
(viewed from rear of truck)

Clutch Device
M=Mechanical
A=Air

Motor Type
1. Single Speed Gear Motor
2. Two Speed Gear Motor
3. Single Seed Geroler
4. Two Speed Geroler
5. Piston
6. Vane
X. No Motor
WINCH MODEL CODES
(PRIOR TO 01-01-03)

Basic Model

Gearbox Position
L=Left
R=Right  
(viewed from rear of truck)

Cable Spooling
O=Over Drum
U=Under Drum  
(viewed from rear of truck)

Motor Type
1=Single Speed Gear Motor
2=Two Speed Gear Motor
3=Single Speed Geroler Motor
5=Piston Motor
6=Vane
X=No Motor

Two speed gearbox
1=Without
2=With
ALL Tulsa Winches have the serial number, and assembly number stamped on the housing or side plate. Please take a few minutes to record these numbers for future use. The assembly number will be required when ordering parts.

| MODEL: | __________________________________________________________________________ |
| SERIAL NO: | __________________________________________________________________________ |
| ASSEMBLY NO: | __________________________________________________________________________ |

Quick reference for parts information:

Tulsa Winch
11135 S. James
Jenks, OK 74037
Voice: (918) 298-8300
Fax: (918) 298-8301
www.team-twq.com
Tulsa Winch Limited Warranty

Effective 8/1/2008
SUPERSEDES ALL PRIOR WARRANTIES

Seller warrants that each article (whether Gear Drive Products, Brake Products and/or Winch Products, all of which are covered hereunder) sold under this order shall at the time of shipment (i) conform to applicable specifications, and (ii) be free from defects in material and workmanship during normal and ordinary use and service (the "Warranty").

Buyer’s exclusive remedy and Seller’s sole obligation under this Warranty shall be, at Seller’s option, to repair or replace any article or part thereof which has proven to be defective, or to refund the purchase price of such article or part thereof. Buyer acknowledges that Buyer is knowledgeable concerning the articles covered by this Warranty and sold in connection therewith which are being purchased, that Buyer has reviewed this Warranty and that the remedies provided hereunder are adequate and acceptable to Buyer.

This Warranty shall expire one (1) year from the date the article is first shipped by Seller. Notice of claimed breach of this Warranty must be given by Buyer to Seller within the applicable period. Such notice shall include an explanation of the claimed warranty defect and proof of date of purchase of the article or part thereof for which warranty coverage is sought. No allowances shall be made by Seller for any transportation, labor charges, parts, "in and out" costs, adjustments or repairs, or any other work, unless such items are authorized in writing and in advance by Seller. Nor shall Seller have any obligation to repair or replace items which by their nature are expendable.

If an article is claimed to be defective in material or workmanship, or not to conform to the applicable specifications, Seller will either examine the article at Buyer’s site or issue shipping instructions for return to Seller. This Warranty shall not extend to any articles or parts thereof which have been installed, used, or serviced otherwise than in conformity with Seller’s applicable specifications, manuals, bulletins, or instructions, or which shall have been subjected to improper installation, operation, or usage, misapplication, neglect, incorrect installation, overloading, or employment for other than normal and ordinary use and service. This Warranty shall not apply to any article which has been repaired, altered or disassembled, or assembled by personnel other than those of Seller. This Warranty shall not apply to any article upon which repairs or alterations have been made (unless authorized in writing and in advance by Seller). This Warranty shall not apply to any articles or parts thereof furnished by Seller to Buyer’s specifications and/or furnished by Buyer or acquired from others at Buyer’s request.

SELLER MAKES NO EXPRESS WARRANTIES AND NO IMPLIED WARRANTIES OF ANY KIND, OTHER THAN THE WARRANTY EXPRESSLY SET FORTH ABOVE. SUCH WARRANTY IS EXCLUSIVE AND IS MADE AND ACCEPTED IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Buyer expressly agrees that Seller is not responsible to perform any work or investigation related in any way to torsional vibration issues and is not responsible for the detection or remedy of Natural Frequency Vibration of the mechanical system in which the unit is installed. Buyer acknowledges, understands and agrees that this Warranty does not cover failures of the unit which result in any manner from the operation of the machine or unit at vibration frequencies at or near the natural frequency vibration of the machine in such a way that damage may result. Buyer expressly agrees that Seller is not responsible for failure damage or accelerated wear caused by machine or ambient vibration. Further, Buyer acknowledges and agrees that Buyer is always solely responsible for determination and final approval of the "application factor" which may be used in Seller’s calculations, and this application factor is 1.0 unless otherwise stated in Seller’s quotation specifications.

The remedies for this Warranty shall be only those expressly set forth above, to the exclusion of any and all other remedies of whatsoever kind. The limited remedies set forth above shall be deemed exclusive, even though they may fail their essential purpose. No agreement varying or extending the foregoing Warranty, remedies, exclusions, or limitations shall be effective unless in a writing signed by an executive officer of Seller and Buyer. This Warranty is non-transferable. If a party who had purchased articles from Buyer, or from persons in privity with Buyer, brings any action or proceeding against Seller for remedies other than those set forth in this Warranty, Buyer agrees to defend Seller against the claims asserted in such action or proceeding at Buyer’s expense, including the payment of attorneys’ fees and costs, and indemnify Seller and hold Seller harmless of, from and against all such claims, actions, proceedings or judgments therein. Buyer also agrees to defend and indemnify Seller of, from and against any loss, cost, damage, claim, debt or expenses, including attorneys’ fees, resulting from any claims by Buyer or third parties to property or injury to persons resulting from faulty installation, repair or modification of the article and misuse or negligent operation or use of the article, whether or not such damage to property or injury to persons may be caused by defective material, workmanship, or construction. ADVISORY: Winches and hoists are not approved for lifting or handling personnel or persons unless specifically approved in writing from Seller for the specific intended application.

Under no circumstances shall Seller be liable (i) for any damage or loss to any property other than the warranted article or part thereof, or (ii) for any special, indirect, incidental, or consequential damage or loss, even though such expenses, damages, or losses may be foreseeable.

The foregoing limitations on Seller’s liability in the event of breach of warranty shall also be the absolute limit of Seller’s liability in the event of Seller’s negligence in manufacture, installation, or otherwise, with regard to the articles covered by this Warranty, and at the expiration of the Warranty period as above stated, all such liabilities shall terminate. Buyer’s purchase of any article(s) covered by this Warranty shall constitute acceptance of the terms and conditions hereof and shall be binding upon Buyer and Buyer’s representatives, heirs and assigns. The laws of the State of Oklahoma shall govern Buyer’s rights and responsibilities in regard to this Warranty and the transaction(s) subject thereto, and the State of Oklahoma shall be the exclusive forum and jurisdiction for any action or proceedings brought by Buyer in connection herewith or any dispute hereunder. If any of the terms and conditions contained within this Warranty are void, the remaining provisions thereof are and shall remain valid and enforceable.

Note: Prices and specifications contained in this price book are subject to change without notice.