THERN

Owner's Manual

For Series TA
Planetary Gear Air Winches

Read this Owner's Manual thoroughly before operating the equipment. Keep it with the equipment at all times. Replacements are available from Thern, Inc., PO Box 347, Winona, MN 55987, 507-454-2996.

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Two-Year Limited Warranty

Thern, Inc. warrants its products against defects in material or workmanship for two years from the date of purchase by the original using buyer, or if this date cannot be established, the date the product was sold by Thern, Inc. to the dealer. To make a claim under this warranty, contact the factory for an RGA number. The product must be returned, prepaid, directly to Thern, Inc., 5712 Industrial Park Road, Winona, Minnesota 55987. The following information must accompany the product: the RGA number, the date of purchase, the description of the claimed defect, and a complete explanation of the circumstances involved. If the product is found to be defective, it will be repaired or replaced free of charge, and Thern, Inc. will reimburse the shipping cost within the contiguous USA.

This warranty does not cover any damage due to accident, misuse, abuse, or negligence. Any alteration, repair or modification of the product outside the Thern, Inc. factory shall void this warranty. This warranty does not cover any costs for removal of our product, downtime, or any other incidental or consequential costs or damages resulting from the claimed defects. This warranty does not cover brake friction material, as these are wear components and their life is subject to use conditions which vary between applications.

FACTORY AUTHORIZED REPAIR OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE EXCLUSIVE REMEDY TO THE CONSUMER. THERN, INC. SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY ON THIS PRODUCT. EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ON THIS PRODUCT IS LIMITED IN DURATION TO THE DURATION OF THIS WARRANTY.

Some states do not allow the exclusion or limitation of incidental or consequential damages, or allow limitations on how long an implied warranty lasts, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Note: Thern, Inc. reserves the right to change the design or discontinue the production of any product without prior notice.

About This Manual

The Occupational Safety and Health Act of 1970 states that it is the employer's responsibility to provide a workplace free of hazard. To this end, all equipment should be installed, operated, and maintained in compliance with applicable trade, industrial, federal, state, and local regulations. It is the equipment owner's responsibility to obtain copies of these regulations and to determine the suitability of the equipment to its intended use.

This Owner's Manual, and warning labels attached to the equipment, are to serve as guidelines for hazard-free installation, operation, and maintenance. They should not be understood to prepare you for every possible situation.

The information contained in this manual is applicable only to Thern Series TA Planetary Gear Air Winches. Do not use this manual as a source of information for any other equipment.

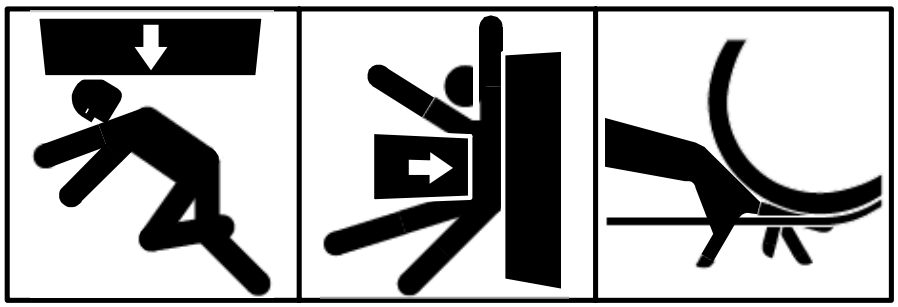
The following symbols are used for emphasis throughout this manual:

WARNING! Failure to follow 'WARNING!' instructions may result in equipment damage, property damage, and/or serious personal injury.

CAUTION! Failure to follow 'CAUTION!' instructions may result in equipment damage, property damage, and/or minor personal injury.

Important! Failure to follow 'important!' instructions may result in poor performance of the equipment.

Suggestions for Safe Operation



WARNING!

DO the following:

Read and comply with the guidelines set forth in this Owner's Manual. Keep this manual, and all labels attached to the winch, readable and with the equipment at all times. Contact Thern, Inc. for replacements.

Check lubrication before use.

Install the wire rope securely to the winch drum.

Keep at least 4 wraps of wire rope wound on the drum at all times, to serve as anchor wraps. Failure to do so could cause the load to fall.

Keep hands away from the drum, gears, wire rope, and other moving parts of the equipment.

Equip the winch with a load brake if it is used to lift loads, or drag loads on an incline. Contact Thern Inc. for more information.

Disconnect air supply before servicing the equipment.

DO NOT do the following:

Do not lift people, or things over people. Do not walk or work under a load or in the line of force of any load.

Do not exceed the load rating of the winch or any other component in the system. To do so could result in failure of the equipment.

Do not use more than one winch to move a load unless each winch was designed for use in a multiple winch system.

Do not use damaged or malfunctioning equipment. To do so could result in failure of the equipment.

Do not modify the equipment in any way. To do so could cause equipment failure.

Do not wrap the wire rope around the load. This damages the wire rope and could cause the load to fall. Use a sling or other approved lifting device.

Do not operate the winch with drive guards or gear covers removed or improperly installed.

Do not divert your attention from the operation. Stay alert to the possibility of accidents, and try to prevent them from happening.

Do not jerk or swing the load. Avoid shock loads by starting and stopping the load smoothly. Shock loads overload the equipment and may cause damage.

Do not leave a suspended load unattended unless specific precautions have been taken to secure the load and keep people away from the winch and out from under the load.

Do not adjust the brake with the load suspended.

1.1 Installing the Winch

WARNING!

Do not install the winch in an area defined as hazardous by the National Electric Code, unless installation in such an area has been thoroughly approved.

Do not install the winch near corrosive chemicals, flammable materials, explosives, or other elements that may damage the winch or injure the operator. Adequately protect the winch and the operator from such elements.

Position the winch so the operator can stand clear of the load, and out of the path of a broken wire rope that could snap back and cause injury.

Attach the winch to a rigid and level foundation that will support the winch and its load under all load conditions, including shock loading.

Important!

- Inspect the winch immediately following installation according to the Instructions for Periodic Inspection. This will give you a record of the condition of the winch with which to compare future inspections.
- A qualified professional should inspect or design the foundation to insure that it will provide adequate support.
- Locate the winch so it will be visible during the entire operation.
- When moving and positioning the winch, lift using the lifting eyes in the frame or with a sling wrapped around the drum.

1.1.1 CONSULT APPLICABLE CODES AND REGULATIONS for specific rules on installing the equipment.

1.1.2 LOCATE THE WINCH in an area clear of traffic and other obstacles. Make sure the winch is accessible for maintenance and operation.

1.1.3 LOCATE THE WINCH in an area with adequate temperatures. Check the motor and reducer manufacturer's information for ambient temperature ratings.

1.1.4 INSTALL THE WINCH on a horizontal surface. The winch is designed and assembled for horizontal base mounting. **Special consideration must be taken if mounting vertically or upside-down. Please contact Thern, Inc.**

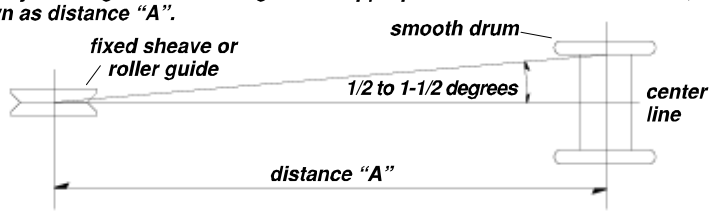
1.1.5 MAINTAIN A FLEET ANGLE between 1/2 and 1-1/2 degrees. The proper fleet angle minimizes wire rope damage by helping the wire rope wind uniformly onto the drum. See figure 1.

1.1.6 FASTEN THE WINCH SECURELY to the foundation with grade 8 mounting bolts. Use self-locking nuts or nuts with lockwashers.

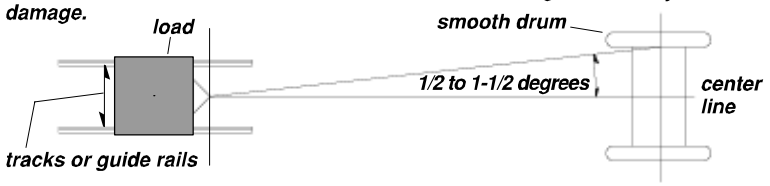
CONTACT A QUALIFIED PROFESSIONAL FOR MOUNTING INSTRUCTIONS TO COMPLY WITH LOCAL CODES.

Figure 1 – Maintaining the Fleet Angle

- *When wire rope travels over a sheave or through a roller guide – maintain fleet angle by locating the sheave or guide an appropriate distance from the drum, shown as distance "A".*



- *When wire rope travels directly to the load – maintain fleet angle by controlling side-to-side movement of the load with tracks or guide rails. Allowing the load to move too far to one side causes stress on the drum flange which may cause damage.*



Important!

- Use a sheave or roller guide to direct the wire rope to the drum whenever possible.
- Install sheaves, tracks and other equipment so they will remain fixed under all load conditions. Follow the recommendations of the equipment manufacturer.
- Use sheaves of proper diameter to minimize wear on the wire rope. Follow the recommendations of the sheave manufacturer.

1.2 Connecting the Air Supply

WARNING!

All control devices must be momentary type. Install all control devices so the winch motor will stop when the operator releases the device.

Locate control devices so the operator will be able to view the load through the entire operation.

Locate control devices so the operator will be clear of the load, the wire rope, and the path of a broken wire rope that could snap back and cause injury.

Important!

- Always disconnect the air supply when the winch is not in use.

1.2.1 THE AIR SUPPLY must be clean and free from moisture. Before making final connections, all air supply lines should be purged with clean, moisture free air or nitrogen before connecting to winch inlet. Supply lines should be as short and straight as installation conditions will permit. Long transmission lines and excessive use of fittings, elbows, tees, globe valves etc. cause a reduction in pressure due to restrictions and surface friction in the lines.

1.2.2 ALWAYS USE an air line lubricator with these motors. The lubricator must have an inlet and outlet at least as large as the inlet on the motor. Install the air line lubricator as close to the air inlet on the motor as possible. Lubricator must be located no more than 10 ft. (3 m) from the motor. The air line lubricator should be replenished daily and set to provide 6 to 9 drops per minute of SAE 10W oil. A fine mist will be exhausted from the throttle control valve when the air line lubricator is functioning properly.

1.2.3 IT IS RECOMMENDED that an air line strainer/filter be installed as close as practical to the motor air inlet port, but before the lubricator, to prevent dirt from entering the motor. The strainer/filter should provide 20 micron filtration and include a moisture trap. Clean the strainer/filter periodically to maintain its operating efficiency.

1.2.4 MOISTURE THAT REACHES THE AIR MOTOR through air supply lines is a primary factor in determining the length of time between service overhauls. Moisture traps can help to eliminate moisture. Other methods, such as an air receiver which collects moisture before it reaches the motor, an aftercooler at the compressor that cools the air to condense and collect moisture prior to distribution through the supply lines are also helpful.

1.2.5 THE AIR MOTOR SHOULD BE INSTALLED as near as possible to the compressor or air receiver. Recommended pressures and volumes are measured at the point of entry to the air motor.

1.2.6 CHECK THE AIR PRESSURE at the motor and make sure it agrees with the pressure rating marked on the winch nameplate.

1.2.7 TEST AIR CONNECTIONS by operating the winch.

a ROTATION OF THE DRUM must agree with the labels on the control device.

CONTACT THE FACTORY OR A QUALIFIED PROFESSIONAL FOR HELP.

1.3 Setting Up the Breather Plug on the Motor

WARNING!

Remove the o-ring from the breather plug on the motor to vent heat and pressure. Failure to do so could result in pressure buildup which could damage the motor.

Important!

- Save the o-ring from the breather plug for use when the winch is removed for storage or transport.

1.3.1 REMOVE THE O-RING from the breather plug.

1.3.2 CHECK THE LUBRICANT LEVEL in the motor to make sure no lubricant was lost during shipment. Refer to the motor manufacturer's instructions.

1.4 Installing the Wire Rope

WARNING!

Install the wire rope securely to the winch drum. A poorly secured wire rope could come loose from its anchor and allow the load to fall.

Important!

- Use wire rope and other rigging equipment rated for the size of the largest load you will be moving.
- Do not drag the wire rope through dirt or debris that could cause damage, or poor operation.
- Always wear protective clothing when handling wire rope.

1.4.1 DETERMINE WHICH DIRECTION the drum must rotate to wind and unwind wire rope.

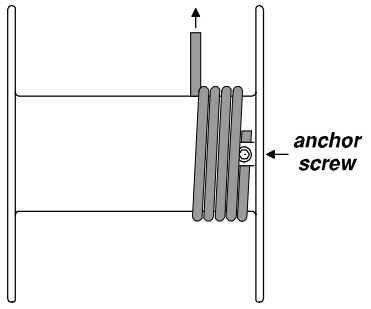
1.4.2 PURCHASE THE PROPER WIRE ROPE for your application. Keep the following in mind when selecting a wire rope. Contact a reputable wire rope supplier for help.

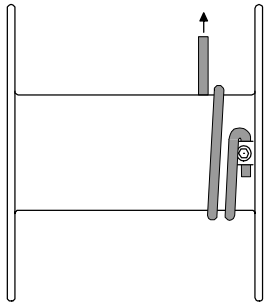
a BREAKING STRENGTH of new wire rope should be at least 3 times greater than the largest load placed on the winch. If loads are lifted or pulled on an incline, the breaking strength must be at least 5 times greater than the largest load. These are minimum values and will vary with the type of load and how you are moving it.

b WIRE ROPE LAY must agree with the winding direction of the drum to help insure proper winding.

c WE RECOMMEND 7 x 19 galvanized aircraft cable for diameters up to 5/16 inch, and 6 x 37 IWRC improved plow steel (IPS) or extra improved plow steel (EIPS) wire rope for diameters of 3/8 inches and up.

Figure 2 – Installing the Wire Rope – Recessed Anchor

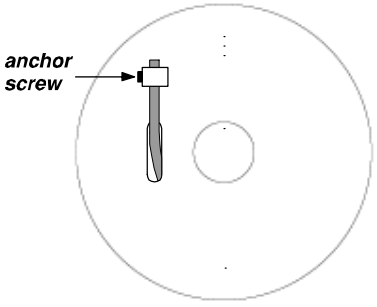


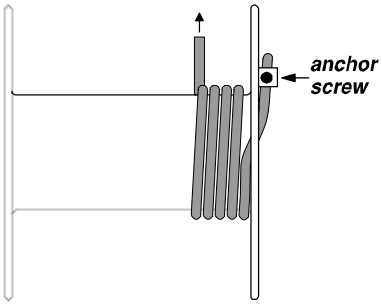


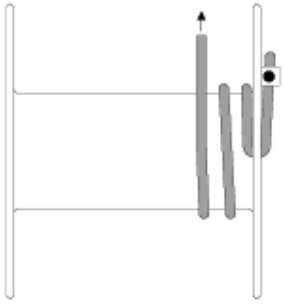
correct *incorrect*

typical installation shown
right lay – underwound

Figure 3 – Installing the Wire Rope – Flange Anchor







correct *correct* *incorrect*

pass wire rope through slot
in flange and into anchor

typical installation shown
right lay – underwound

1.4.3 ANCHOR THE WIRE ROPE to the drum using either the recessed or flange anchor.

a FOR RECESSED ANCHOR INSTALLATION. See figure 2.

- PASS THE WIRE ROPE over the drum from the front and through the recessed anchor hole. Make sure at least 1/2 inch of wire rope extends past the set screw, and the end of the wire rope does not protrude out where it will interfere with wire rope winding onto the drum.
- TIGHTEN THE SETSCREW in the recessed anchor block to securely hold the wire rope in place.
  - Some applications may require underwind operation. Consult the factory prior to use.

b FOR FLANGE ANCHOR INSTALLATION. See figure 3.

- PASS THE WIRE ROPE over the drum from the front and through the slot in the drum flange.
- PASS THE WIRE ROPE through the hole in the anchor block. Make sure at least 1/2 inch of wire rope extends past the set screw, and the end of the wire rope does not protrude out where it will hit other components as the drum is turning.
- TIGHTEN THE SETSCREW in the anchor block to securely hold the wire rope in place.

1.4.4 WIND FOUR FULL WRAPS of wire rope onto the drum by operating the winch while holding the wire rope taught. **These wraps serve as anchor wraps and must remain on the drum at all times.**

2.1 General Theory of Operation

Important!

- Limit nonuniform winding by keeping tension on the wire rope and by maintaining the proper fleet angle.
- To help insure rated performance, make sure the air pressure at the motor is equal to the motor's pressure rating.
- It is your responsibility to detect and account for different factors affecting the condition and performance of the equipment.
- When determining whether the load will exceed the load rating, consider the total force required to move the load.

2.1.1 THE PULL REQUIRED to move the load must not exceed the load rating of the winch. Consider the total force required to move the load, not the weight of the load.

2.1.2 THIS EQUIPMENT CAN develop forces that will exceed the load rating. It is the responsibility of the equipment user to limit the size of the load. Inspect the equipment regularly for damage according to the instructions contained in this manual and in the component manufacturer's information.

2.1.3 USE A LOAD BRAKE on all winches used to lift loads or drag loads on an incline.

2.1.4 PERFORMANCE RATINGS of the equipment are affected by the amount of wire rope wound on the drum, the way in which it is wound, air power supply, and the way the winch is used.

a DRUM CAPACITY depends on how tightly and evenly the wire rope is wound on the drum. Actual drum capacities are usually 25-30% less than values shown in performance tables, due to loose winding and overlapping.

b LINE SPEED increases with each additional layer of wire rope wound onto the drum. Line speed will also vary with load weight and air power supply.

c LOAD RATING represents the maximum pull that can be placed on new equipment. Load ratings are assigned values for specific amounts of load travel or wire rope accumulation. The load rating decreases as layers of wire rope accumulate on the drum.

2.1.5 DUTY RATINGS refer to the type of use the equipment is subject to. Consider the following when determining duty rating.

a ENVIRONMENT: harsh environments include hot, cold, dirty, wet, corrosive, or explosive surroundings. **Protect the equipment from harsh environments when possible.**

b MAINTENANCE: poor maintenance, meaning poor cleaning, lubrication, or inspection, leads to poor operation and possible damage of the equipment. **Minimize poor maintenance by carefully following the instructions contained in this manual.**

c LOADING: severe loading includes shock loading and moving loads that exceed the load rating of the equipment. **Avoid shock loads, and do not exceed the load rating of the equipment.**

d FREQUENCY OF OPERATION: frequent start and stop functions increase wear and shorten the life span of the gear train and load brake components. Lengthy operations cause lubrication to become hot, which also decreases the life span of the gear train. **Increase maintenance of the equipment if used in frequent operations.**

CONTACT THE FACTORY FOR MORE INFORMATION.

2.2 Adjusting the Band Brake

2.2.1 INSPECT THE DRUM BAND BRAKE LINING for oil, grease and glazing. If the drum band brake lining is oil-soaked replace the brake bands as a set. Remove glazed areas of band brake lining by sanding lightly with a fine grit emery cloth.

2.2.2 MEASURE THE THICKNESS OF THE DRUM BAND BRAKE LINING. If the drum brake band linings are less than 0.062 inch thick anywhere along the edges replace the brake bands as a set.

2.2.3 RELEASE WIRE ROPE TENSION on the drum.

2.2.4 RAISE THE BAND BRAKE HANDLE to free the brake bands.

2.2.5 ROTATE THE BRAKE ADJUSTING NUT to adjust band brake tension. Turn the nut clockwise to increase tension in the brake bands. Turn the adjusting nut 1/2 turn at a time.

2.2.6 CHECK BRAKE ADJUSTMENT by engaging the band brake. The brake should be adjusted until the brake can be pushed into the lock position with 50 to 100 lb of force on the handle.

2.3 Preparing for Operation

WARNING!

Read and comply with the guidelines set forth in this Owner's Manual. Keep this manual, and all labels attached to the winch, readable and with the equipment at all times. Contact Thern, Inc. for replacements.

Do not lift people, or things over people. Do not walk or work under a load or in the line of force of any load.

Do not exceed the load rating of the winch or any other component in the system. To do so could result in failure of the equipment.

Equip the winch with a load brake if it is used to lift loads, or drag loads on an incline. Contact Thern Inc. for more information.

Do not use more than one winch to move a load unless each winch was designed for use in a multiple winch system.

Do not use damaged or malfunctioning equipment. To do so could result in failure of the equipment.

Do not modify the equipment in any way. To do so could cause equipment failure.

Do not operate the winch with drive guards or gear covers removed or improperly installed.

Check lubrication before use.

Important!

- Obey a stop signal from anyone.
- Maintain tension on the wire rope to keep it tightly and evenly wound on the drum.
- If the winch and load are not visible during the entire operation, get help from another person.
- Appoint a supervisor if more than one person is involved in the operation. This will reduce confusion and increase safety.
- When lifting a load, use a tag line to keep the load from swinging or twisting, while keeping yourself away from the load.

2.3.1 CONSIDER THE OPERATION. Do not begin until you are sure you can perform the entire operation without hazard.

2.3.2 BEFORE EACH OPERATION inspect all components of the system.

a INSPECT THE WINCH and other equipment according to the Instructions for Frequent Inspection. Do not operate winch until all defects have been corrected.

b OPERATORS must be in good health, alert, thoroughly trained in operating the equipment, and properly clothed (hard hat, safety shoes and safety glasses, no loose clothing).

c THE LOAD must be clear of other objects and free to move. Make sure the load will not tip, spin, roll away, or in any way move uncontrollably.

2.3.3 BEFORE THE WINCH IS PLACED INTO SERVICE or for winches that have been in storage for a period of more than one month, the following start-up procedure is required.

a INSPECT THE WINCH and other equipment according to the Instructions for Periodic Inspection.

b WHEN FIRST RUNNING THE MOTOR pour a small amount of 10W oil in the motor inlet port and operate the motor slowly in both directions for a few minutes to flush out any impurities.

c WHEN FIRST OPERATING THE WINCH it is recommended that the motor be driven slowly in both directions for a few minutes.

2.3.4 PRIOR TO INITIAL USE, all new, altered or repaired winches shall be tested to ensure proper operation. Check oil level in motor, reduction gear assembly and disc brake are correct. To initially 'break in' new or overhauled motors operate without load, in both directions, for 2 hours at 100 – 200 RPM. New Drum Brake Band Lining Run-in Procedure: All new drum brake band linings require a 'run-in' period. Operate the winch without load in the payout direction while gradually applying the brake. Allow the brake to slip for approximately one minute. Winch motor may stall as drum brake band lining fully engages. Do not allow brake to overheat. Check operation of brakes. Adjust if necessary, see the instruction for Adjusting the Band Brake.

2.3.5 KNOW YOUR LOAD and make sure you do not exceed the load rating of the winch or other equipment in the system.

2.4 Attaching the Load

WARNING!

Do not wrap the wire rope around the load. This damages the wire rope and could cause the load to fall. Use a sling or other approved lifting device.

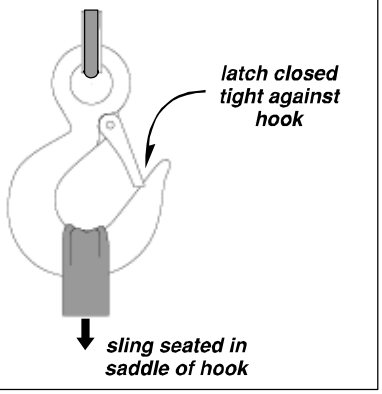
2.4.1 CLEAR OBJECTS from the path of the load so you can move it freely and observe it at all times during the operation.

2.4.2 ATTACH THE LOAD using a nylon sling, or other approved lifting device. Follow the recommendations of the sling manufacturer.

a SEAT THE SLING in the saddle of the hook with the hook latch completely closed. See figure 4.

b CENTER THE LOAD on the hook so it will remain balanced and not tip or rotate to one side.

Figure 4 – Attaching Load



2.5 Moving the Load

WARNING!

Keep at least 4 wraps of wire rope wound on the drum at all times, to serve as anchor wraps. With less than 4 wraps on the drum the wire rope could come loose, causing the load to fall.

Keep all people, including operators and yourself, away from the winch. Keep out of the path of the load, and out of the path of a broken wire rope that might snap back and cause injury.

Keep hands away from the drum, gears, wire rope, and other moving parts of the equipment.

Do not divert your attention from the operation. Stay alert to the possibility of accidents, and try to prevent them from happening.

Do not jerk or swing the load. Avoid shock loads by starting and stopping the load smoothly. Shock loads overload the equipment and may cause damage.

Do not leave a suspended load unattended unless specific precautions have been taken to secure the load and keep people away from the winch and out from under the load.

2.5.1 MOVE THE LOAD slowly and smoothly, only a small distance at first. Make sure the load is balanced and securely attached before continuing.

2.5.2 USE THE CONTROL DEVICE to operate the winch. The control device should be momentary type, so the winch will stop when the operator releases the control.

2.5.3 THE MANUAL DRUM BRAKE may be applied by pushing down on the handle and released by pulling up. If the handle is pushed down fully, it should lock in that position and prevent drum rotation, until released by the operator. The brake must be kept properly adjusted to hold the required load.

2.5.4 THE OPTIONAL AUTOMATIC DISC BRAKE is a spring applied, air released brake. The brake automatically disengages when the motor is operated. When the control valve is placed in the neutral position, the brake automatically engages preventing drum rotation.

2.5.5 OBSERVE THE WIRE ROPE as it winds onto the drum. If it becomes loose, uneven, or overlapped, stop the operation and rewind the wire rope before continuing. **Continued operation with overlapped or uneven wire rope can damage the wire rope and shorten its life.**

2.5.6 OBSERVE THE REDUCER AND MOTOR during operation for signs of overheating. **Frequent overheating may be a sign of damage, or may indicate the need for a larger power winch.**

a WATCH FOR SMOKE, the smell of burnt lubricant, and other signs of overheating. Use a thermocouple or other device to monitor reducer temperature.

b STOP THE OPERATION if the reducer or motor overheats, and allow the winch to cool. **Continued operation may cause damage.**

2.5.7 IN CASE OF AIR SUPPLY FAILURE, shut off the air supply line valve and DISCONNECT the air supply line from the winch. Leave the air supply DISCONNECTED.

2.5.8 GRADUALLY RELEASE THE BAND BRAKE to slowly lower the load.

2.5.9 IF EQUIPPED WITH A DISC BRAKE, supply at least 50 psi air pressure to the disc brake inlet from an alternate air supply to release the disc brake, and slowly lower the load using the band brake.

3.1 Cleaning the Winch

Important!

Increase the frequency of maintenance procedures if the winch is:

- Operated for long periods.
- Used to pull heavy loads.
- Operated in wet, dirty, hot, or cold surroundings.

Clean the winch to remove dirt and help prevent rust and corrosion.

3.1.1 CLEAN THE WINCH every six months or whenever it is dirty. Wipe down all equipment to remove dirt and grease.

3.1.2 REMOVE ALL UNNECESSARY OBJECTS from the area around the winch.

3.2 Lubricating the Winch

WARNING!

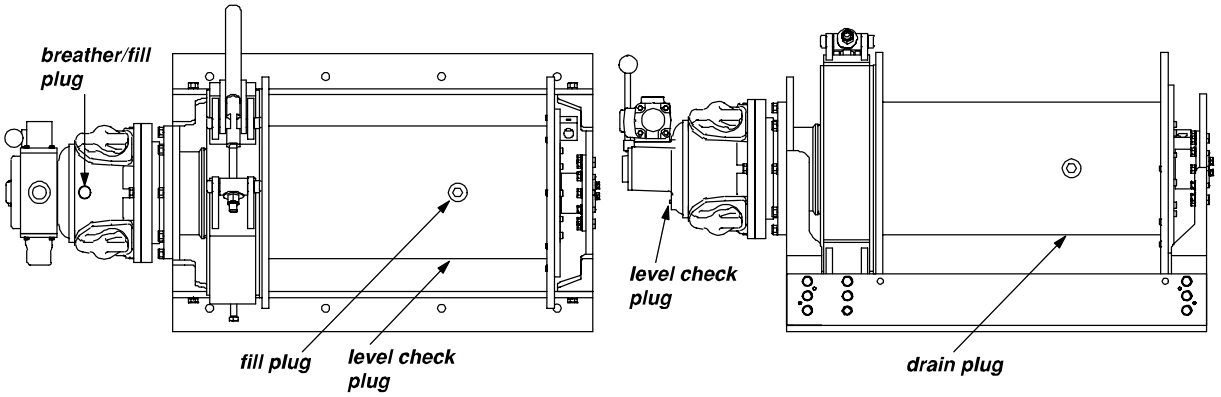
Make sure the motor breather plug is clean and open to vent heat and pressure. Poor ventilation may cause overheating and result in damage to oil seals and other equipment.

Fill the speed reducer and motor to the proper level without overfilling. Too much or too little lubricant will cause overheating and result in damage to seals, bearings, and gears.

Important!

- Do not leave plug holes in the reducer or motor open. Open plug holes will allow dirt and moisture to contaminate the lubrication.
- Make sure lubricant has a temperature rating appropriate for the ambient temperatures of the operation.

Figure 5 – Lubricating the Winch



Lubricate the winch properly to help protect it from wear and rust. Read the following instructions carefully.

3.2.1 LUBRICATE THE REDUCER AND MOTOR according to the manufacturer's instructions.

a FILL THE REDUCER AND MOTOR with oil before operating the winch. Fill the reducer and motor until oil reaches the level check plug. **Do not mix different lubricants.**

b CHECK OIL LEVEL before every operation and every 10 hours during operation. Remove the level check plug and make sure oil is even with the plug hole.

c CHANGE REDUCER AND MOTOR LUBRICANT at least every 2 years, or whenever it is dirty or contaminated.

d THE REDUCER is not equipped with a breather plug.

3.2.2 Lubricate the wire rope by following the wire rope manufacturer's recommendations.

3.2.3 IF WINCH IS DISASSEMBLED, clean all parts thoroughly and coat bearings and seals with clean grease. Use sufficient grease to provide a good protective coat.

3.3 Inspecting the Equipment

Important!

- Start an inspection program as soon as you put the winch into use.
- Appoint a qualified person to be responsible for regularly inspecting the equipment.
- Keep written records of inspection. This allows comparison with comments from previous inspections so you can see changes in condition or performance.

Inspect the winch to detect signs of damage or poor operation before they become hazardous.

3.3.1 CONSULT APPLICABLE CODES AND REGULATIONS for specific rules on inspecting the winch and other equipment.

3.3.2 CHECK COMPONENT MANUFACTURER'S INSTRUCTIONS for inspecting the motor, brake, reducer, bearings, wire rope, and other equipment.

Perform frequent inspections:

- Before each operation.
- Every 3 hours during operation.
- Whenever you notice signs of damage or poor operation.

3.3.3 Instructions for Frequent Inspection

a VISUALLY INSPECT the entire winch and all other equipment involved in the operation.
- Check all equipment for cracks, dents, bending, rust, wear, corrosion and other damage.
- Visually inspect all connections, fittings, hoses and components for indication of air leaks. Repair any leaks or damaged components found.
- During operation of winch, verify response to control is quick and smooth. If winch responds slowly or movement is unsatisfactory.
- During winch operation test brakes.
- Make sure the wire rope is installed correctly and anchored securely to the drum.
- Check the reducer and motor for signs of leakage.
- Make sure the entire winch is properly lubricated.
- Make sure the motor breather plug is clean, open, and installed correctly.
- Make sure mounting fasteners are tightened securely.
- Make sure the foundation is in good condition, and capable of supporting the winch and its load under all load conditions.

b TEST WINCH PERFORMANCE by moving a test load equal to 10% of the rated capacity.
- Listen for unusual noises, and look for signs of damage as you operate the winch.
- Make sure the wire rope winds evenly and tightly onto the drum. If it is loose or uneven, rewind it before continuing.
- Make sure the load moves smoothly, without hesitation or strain.
- Make sure the winch responds to the control device. It must rotate as shown on the control labels, and it must turn off when you release the control.
- Check the brake. Raise the load, then lower it and stop it, while engaging the brake, a few feet off the ground. If the load continues to coast or creep, the brake needs adjustment. Refer to instructions for Adjusting the Band Brake.

Completely correct all problems before continuing. Use the Troubleshooting Chart to help determine the cause of certain problems. See table 2.

Perform periodic inspections:

- Every 6 months.
- Whenever you return the winch to service from storage.
- Whenever you notice damage or poor operation in a frequent inspection.
- Whenever you have, or think you may have, overloaded or shock loaded the winch.

3.3.4 Instructions for Periodic Inspection

a VISUALLY INSPECT the winch and all other equipment.
- Disassembly may be required as a result of frequent inspection findings or in order to properly inspect the individual components.
- Check the finish for wear, flaking, or other damage.
- Check all equipment for cracks, dents, bending, rust, wear, corrosion and other damage.
- Check all fasteners for stripped threads, wear, bends, and other damage.

- Make sure all labels and plates are readable, firmly attached, free of damage and clean. Replacements are available from the factory.
- Check the reducer and motor for signs of leakage.

b REMOVE THE WINCH FROM THE FOUNDATION.

- Check mounting fasteners for stripped threads, wear, and other damage.
- Check the foundation for cracks, corrosion, and other damage.

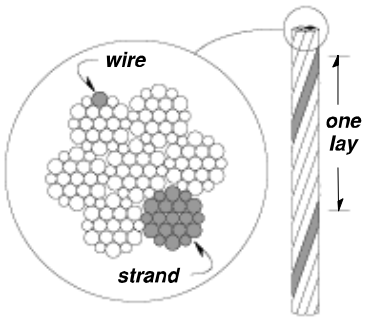
c DRAIN A SMALL AMOUNT OF LUBRICANT from the reducer and motor into a clean container.

- Check the lubricant for dirt, metal particles, water, and other signs of contamination. Completely drain the reducer and motor if lubricant is contaminated.

d REMOVE THE WIRE ROPE entirely from the drum.

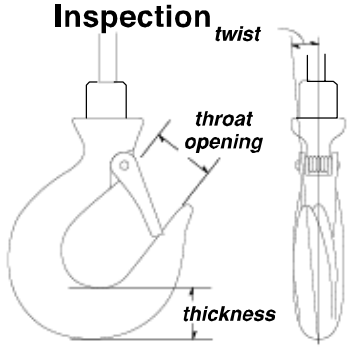
- Always wear protective clothing when handling wire rope.
- Check the entire length of wire rope for bent wires, crushed areas, broken or cut wires, corrosion, and other damage. Carefully inspect areas that pass over sheaves or through roller guides.
- Note the location and concentration of broken wires. Replace wire rope if more than 6 wires are broken in one lay, or more than 3 wires are broken in one strand in one lay. See figure 6.

Figure 6 – Broken Wires



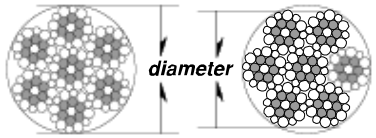
Wire rope assembly must be replaced if more than 6 wires are broken in one lay, or if more than 3 wires are broken in one strand in one lay.

Figure 7 – Hook Inspection



The wire rope assembly must be replaced if the throat opening is 15% wider than nominal, if the thickness is 10% less than nominal, or if the hook is twisted 10 ° or more.

Figure 8 – Rope Diameter



The wire rope assembly must be replaced if the diameter measures less than the minimum diameter at any point.

nominal wire rope diameter	maximum allowable reduction from nominal diameter
up to 1/2 in	1/32 in (.0313 in)
up to 3/4 in	3/64 in (.0469 in)
up to 1-1/8 in	1/16 in (.0625 in)

- Make sure the load hook or other device is securely attached to the wire rope, and the wire rope where it is attached is not frayed, corroded, broken, or otherwise damaged.
- Measure the throat opening, thickness, and twist of the hook. Replace the hook if it shows signs of damage. See figure 7.
- Make sure hook latch opens without binding and closes when released.
- Check the anchor holes in the drum and the surrounding area for signs of wear or distortion.

e PLACE 100 POUNDS of tension on the wire rope.

- Measure the diameter of the wire rope, especially in areas where wear is noticeable. Replace the wire rope if the diameter measures below the minimum diameter at any point. See figure 8.

f MOVE THE DRUM with your hands.

- Check for excessive movement indicating worn or loose gears or bearings. Excessive movement is caused by overloading or overheating, and is a sign that your application may require a larger power winch.
- Disassemble the winch if necessary. Inspect keys, bearings, seals, and shafts for wear, distortion, and other damage.

g FASTEN THE WINCH securely to the foundation.

h FILL THE REDUCER AND MOTOR with lubricant, and lubricate the entire winch.

i INSTALL THE WIRE ROPE.

j INSPECT THE BAND BRAKE.

- MEASURE THE THICKNESS OF THE BAND BRAKE LINING. If the brake band linings are less than 0.062 inch thick anywhere along the edges replace the brake bands as a set.
- INDIVIDUALLY TEST BRAKES installed to ensure proper operation. Brakes must hold a 125% rated load with full drum without slipping. If indicated by poor operation or visual damage, disassemble and repair brake(s). Check all brake surfaces for wear, deformation or foreign deposits. If brake lining thickness is less than minimum as described above replace brakes. Clean and replace components as necessary.
- INSPECT THE BAND BRAKE LINING for oil, grease and glazing. If the band brake lining is oil-soaked replace the brake bands as a set. Remove glazed areas of band brake lining by sanding lightly with a fine grit emery cloth.

k CONNECT THE AIR SUPPLY.

l TEST WINCH PERFORMANCE by operating the winch with a test load equal to the load rating.

- Listen for unusual noises, and look for signs of damage as you operate the winch.
- Make sure the wire rope winds evenly and tightly onto the drum. If it is loose or uneven, rewind it before continuing.
- Observe the rotating drum, look for signs of loose or misaligned bearings.
- Make sure the winch responds to the control device. It must rotate as shown on the control labels, and it must turn off when you release the control.
- Make sure the load moves smoothly without hesitation or strain.
- Check the band brake. Raise the load, then lower it a little and stop it, while engaging the brake, a few feet off the ground. If the load continues to coast or creep, the brake needs adjustment. Refer to the instruction for Adjusting the Band Brake.

Completely correct all problems before continuing. Use the troubleshooting chart to help determine the cause of certain problems. See table 2.

Table 1 — Inspection Checklist

	damages	**problems**
general	finish weathered, flaking, otherwise damaged	winch jerks or hesitates during operation
	parts cracked, bent, rusted, worn, otherwise damaged	unusual noises, other signs of malfunction
fasteners	stripped threads, bent, worn, otherwise damaged	loose, not tightened to proper torque
reducer	gears, bearings, or shafts loose, worn, otherwise damaged	not properly lubricated
	lubricant leakage	lubricant contaminated
wire rope	bent, crushed, otherwise damaged	wire rope loosely or unevenly wound
	broken wires, see figure 6	
	replace if more than 6 wires in one lay,	number per strand =
	or 3 wires in one strand in one lay, are broken	number per lay =
	diameter reduced, see figure 8	
	replace if diameter is excessively worn	diameter =
end connections	corroded, rusted, worn, otherwise damaged	not securely attached
hook or other device	twisted, bent, worn, otherwise damaged, see figure 7	hook latch fails to close when released
	replace if twist is 10 degrees or more	twist =
	replace if throat width is 15% larger than nominal	throat width =
	replace if thickness is 10% less than nominal	thickness =
drum	anchor worn, distorted, otherwise damaged	excessive movement or backlash
motor/	motor corroded, worn out, otherwise damaged	motor is sluggish, or operates poorly
brake	brake worn, corroded, otherwise damaged	brake does not operate properly
	Brake does not hold 125% load capacity	
control device	control components corroded, worn out, otherwise damaged	fails to control winch properly
air supply	air lines cracked, cut, corroded, otherwise damaged	air lines unprotected, obstructing traffic
	connections loose, corroded, otherwise damaged	pressure at motor =
labels and plates	dirty, illegible, otherwise damaged	loosely attached or missing
comments		
authorized signature		**date**

Table 2 — Troubleshooting Chart

problem	cause	correction
motor won't run	No air supply to winch	Check air supply line connections and hoses
	load too heavy	lighten load
	motor damaged	repair or replace as necessary
motor runs, drum doesn't turn	loose or broken gear keys or splines	inspect and replace as necessary
	loose, stripped or broken gears	inspect and replace as necessary
motor tries to turn but can't	unit overheated	allow to cool
	Motor may be damaged	inspect and repair as necessary
	load too heavy	lighten load
	insufficient air supply	Verify air supply pressure and volume at winch inlet meets the requirements listed. Clean air line filter.
	Brake may not be released	inspect and repair as necessary
	gears or bearings broken or locked	inspect and replace as necessary
brake does not operate properly	brake release lever in release position	move to lock position
	Low air supply pressure on optional disc brake	Ensure the air pressure at the inlet to the disk brake is at least 50 psi
	brake adjusted incorrectly	inspect and adjust brake
	brake worn or damaged	inspect and replace as necessary
	brake components seized up or damaged	inspect and repair as necessary
	load too heavy	lighten load
lubricant leakage	worn bearings	inspect and replace as necessary
	damaged oil seals or gaskets	inspect and replace as necessary
	cracked or damaged reducer or motor	inspect and repair as necessary
excessive end play on drive shaft	loose or damaged keys, keyways or splines	inspect and replace as necessary
	excessively worn gears	inspect and repair as necessary
excessively worn gears or bearings	load too heavy	lighten load
	poor lubrication of reducer or bearings	inspect and lubricate as necessary
overheating	operated too long without rest	allow to cool
	load too heavy	lighten load
	poor lubrication	inspect and lubricate as necessary
	breather plug clogged or damaged	clean or replace vent plug as needed
	bearing seized up	inspect and replace as necessary
	Low oil level in the motor or reducer	Check oil levels and add or drain as necessary
	contaminated lubrication	Drain, clean and lubricate as necessary
unusual noises		
	high pitched squeak	poor lubrication inspect and lubricate as necessary
	grinding noise	contaminated lubrication drain, clean and lubricate the winch
		broken gears or bearings inspect and replace as necessary

	knocking motor	load too heavy lighten load
		motor overheated allow to cool
		Damaged motor inspect and replace as necessary
	rattling noise	loose fasteners or set screws tighten all fasteners and screws
	worn or loose band brake	inspect and repair or tighten as necessary
	heavy thump during operation	contaminants in lubricant drain, clean and lubricate the winch
	loose set screws or keys in gears or shafts	inspect and repair as necessary
	bearings defective	inspect and replace as necessary
winch runs slow	improper hose or fitting sizes	check fittings, connections and hoses for correct size and length. Replace parts that may cause restricted air flow. Ispect air line filter.
	load too heavy	lighten load
	motor may be damaged	inspect and replace as necessary
	bearing seized up	inspect and replace as necessary
air lines freeze	water in air supply	install or drain air system moisture traps, moisture collecting air receivers and compresser aftercoolers. After corrective actions have been taken, disconnect lines at winch inlet and purge with clean, dry air or nitrogen prior to attaching to and operating winch

3.4 Repairing the Winch

Important!

- It is your responsibility to determine when to replace parts. When considering whether to continue using a part or to replace it, remember that replacing it is the best way to avoid further equipment damage.
- Replace spring pins, retaining rings, and oil seals whenever the winch is disassembled for inspection or repair.
- Appoint a qualified person to be responsible for all repairs to the equipment.
- Turn off air system and depressurize air lines before performing any maintenance.

3.4.1 GET FACTORY AUTHORIZATION for all repairs. Unauthorized repairs will void the warranty, and may lead to damage or failure of the winch.

3.4.2 REPLACE DAMAGED OR POORLY OPERATING PARTS with Thern repair parts.

3.4.3 CLEAN THE DRUM BRAKE BAND using a wire brush or emery cloth. Do not wash the drum brake band in liquid. If the drum brake band lining is oil soaked, it must be replaced.

a INSPECT THE DRUM BAND BRAKE LINING for oil, grease and glazing. If the drum band brake lining is oil-soaked replace the brake bands as a set. Remove glazed areas of band brake lining by sanding lightly with a fine grit emery cloth.

b MEASURE THE THICKNESS OF THE DRUM BAND BRAKE LINING. If the drum brake band linings are less than 0.062 inch thick anywhere along the edges replace the brake bands as a set.

3.4.4 REFINISH AREAS where the paint is worn or flaking. A good finish helps to protect against corrosion and weather damage.

a REMOVE THE FINISH from damaged areas, down to the bare metal.

b CLEAN THE AREA thoroughly.

c REPAINT with a high quality primer and finishing coat.

3.4.5 TO ORDER REPAIR PARTS, contact your local dealer. Include the following information when ordering:

- model number
- serial number (or code number)
- part number
- date purchased, and from whom
- description of what happened, or what is wrong
- your name and return address

4.1 Transporting the Winch

Important!

- Keep a record of what you ship, and when you send it.

4.1.1 INSTALL THE O-RING onto the motor breather plug or the motor to prevent the loss of lubrication during shipment.

4.1.2 PACK THE WINCH in an upright position for transport, using the original packaging materials, if possible.

a FASTEN THE WINCH to a wooden base using bolts, to keep it from moving during transport.

b SEAL THE WINCH in plastic with a desiccant to help protect it from rust, corrosion, and other damage.

c CONSTRUCT WOODEN SIDES and top to enclose the winch in a solid protective crate.

d PACK LOOSE PARTS in small boxes or ship separately.

4.1.3 INSPECT THE WINCH according to the Instructions for Periodic Inspection before installing it in a new location.

4.2 Storing the Winch

4.2.1 FILL THE REDUCER AND MOTOR with lubricant, and make sure the motor breather plug is clean and properly installed. Add a rust preventative for long term storage. Follow the reducer and motor manufacturer's instructions.

4.2.2 SEAL THE WINCH in plastic with a desiccant to help protect it from rust, corrosion, and other damage.

4.2.3 STORE THE WINCH upright, in a cool clean place away from corrosive chemicals and moisture.

4.2.4 ROTATE THE DRUM PERIODICALLY to keep bearing and gears surfaces from becoming lacquered. Release the brake to rotate the drum.

4.2.5 INSPECT THE WINCH according to the Instructions for Periodic Inspection before installing it for operation.

4.2.7 DRAIN THE REDUCER AND MOTOR and fill with proper lubricant prior to operation.

2.2a Air Valve Adjustment

(See Figure 3A)

If winch operating speeds while lowering or paying out differs from performance specifications the air valve flow restrictor screw may require adjustment.

Caution

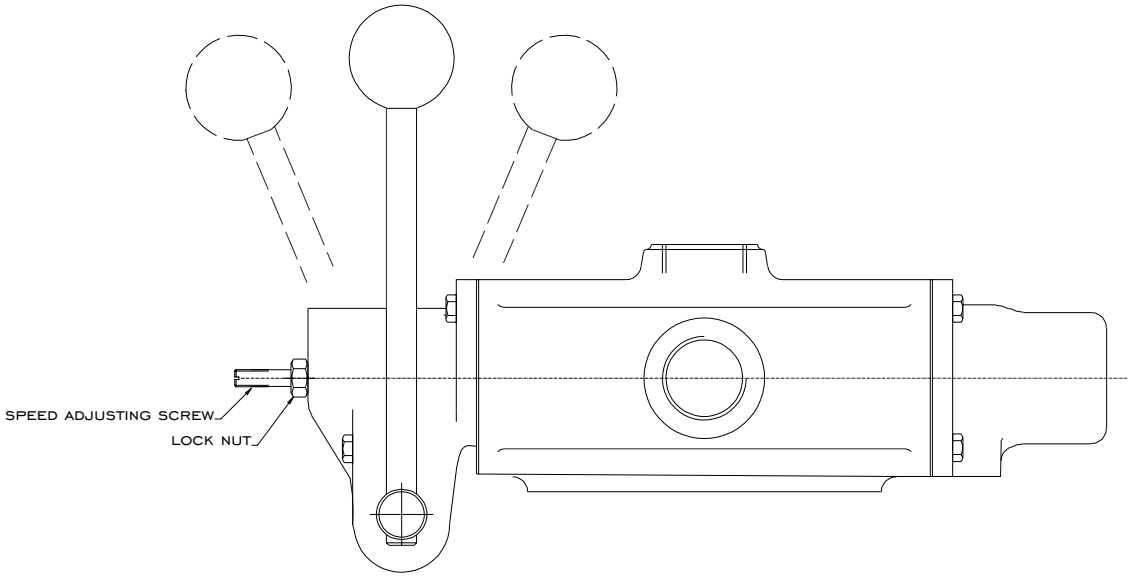
Do not adjust the flow restrictor screw while suspending or hoisting a load.

Adjustment for lifting applications: Loosen locknut and adjust screw located in the valve end cap, until drum speed for no-load payout is about 1/2 the drum speed for no-load load haul-in. Re-tighten the locknut after adjusting the screw. It is suggested that a chalk mark be placed on the drum flange so that drum rpm can be accurately counted.

Note: This adjustment setting is only a recommendation for initial startup in order to prevent over speeding while lowering. The actual adjustment required is dependent on the load and the specific unit purchased.

Adjustment for pulling applications: Loosen locknut and adjust screw located in the valve end cap, until drum speed for no-load payout equals the drum speed for no-load load haul-in. Re-tighten the locknut after adjusting the screw. It is suggested that a chalk mark be placed on the drum flange so that drum rpm can be accurately counted.

Figure 3A – Air Valve Adjustment



3.2a Oil Drain/Fill Process

- Locate 2 of the large pipe plugs in the sides of the drum located at approximately 90 degrees to one another. These are access plugs to the reducer drain and fill plugs. (Dependant on the model there may be two or three pipe plugs in the drum.)
- Remove the first of the access plugs from the drum. See figure 5 – Lubricating the Winch on page 13.
- By peering into the now opened access plug hole you will find another pipe plug which is in the reducer. Remove it. (This will become the drain hole.)
- Rotate the drum so that the open access plug hole is down at the 6 o'clock position and a second access plug is located approximately 90 degrees from it on the side of the drum. See figure 5
- Remove the access plug in the side of the drum.
- By peering into the now opened access plug hole in the side of the drum you will find another pipe plug which is in the reducer. Remove it. (Removing this plug will speed up the drain process and will become the fill hole.)
- Allow for the oil to completely drain.
- Rotate the drum so that one hole is at the 3 o'clock or the 9 o'clock position and the other is approximately at the 12 o'clock position. The hole in the 12 o'clock position will now become the fill hole and the hole on the side of the drum will become the level hole. (The 12 o'clock position may vary per model.)
- Fill the reducer with oil until the oil shows at the reducer level hole in the side of the drum.
- Insert the oil level reducer plug into the reducer and tighten and then install the access plug into the drum.
- Finish by installing the reducer fill plug into the reducer and install the access plug into the drum.