

MAINTENANCE

ASSEMBLE AND INSTALL PRIMARY ASSEMBLY

- ASSEMBLE PRIMARY ASSEMBLY (Refer to PRIMARY ASSEMBLY DRAWING)

WARNING

FAILURE TO PROPERLY ASSEMBLE THE PRIMARY ASSEMBLY COULD RESULT IN A WINCH BRAKE FAILURE AND ALLOW THE LOAD TO DROP, CAUSING PROPERTY DAMAGE, SEVERE INJURY OR DEATH. READ AND UNDERSTAND THE FOLLOWING INSTRUCTIONS BEFORE ASSEMBLING THE PRIMARY ASSEMBLY.

Clean and dry all components, particularly the threaded holes of the Primary Base #535. Support the Primary Base on blocks with the threaded holes facing up.

Lightly oil the Primary Base at the Brake Shaft Seal gland. Grease a new Brake Shaft Seal #580 and install it into the Primary Base. Secure Brake Shaft Seal with Retainer #585.

Liberally grease the Reduction End of the Clutch Assembly #500. Use a twisting motion to insert the Clutch Assembly through the Brake Shaft Seal, carefully preventing the sharp Brake Shaft gear teeth from damaging the lip of the seal. Ensure that the Clutch Assembly Bearing is bottomed against the Primary Base.

Install the Brake Locator #570 into the Primary Base.

Lightly oil the two Brake Discs #560 and three Brake Separators #565. Install the first Brake Separator followed by the first Brake Disc. Install the second Brake Separator and then the second Brake Disc. Install the third Brake Separator.

IMPORTANT: BACKUP RINGS PREVENT O-RINGS FROM EXTRUDING UNDER HIGH PRESSURE AND MUST BE LOCATED BETWEEN THE O-RING AND EXTRUSION GAP. INSTALL BACKUP RINGS ACCORDING TO INSTRUCTIONS.

Lightly grease new Brake Piston large O-Ring #530 and small O-Ring #540. Install the O-Rings into the appropriate glands of the Brake Piston #555 with the large O-Ring at the gland nearest the Brake Spring side.

Slide both O-rings to the inside of their glands, towards the middle of the Piston. Install the large Backup Ring #531 and small Backup Ring #541 into the appropriate glands on the outside of the O-Rings. Refer to the **PRIMARY ASSEMBLY DRAWING** to ensure that the Backup Rings are in the correct position relative to the O-Rings.

Lightly oil the Primary Base where the two Piston O-Rings seat. Position the Brake Piston on the Primary Base, oriented so that the Brake Conduit port will align with the corresponding port on the Motor Assembly. Carefully and evenly, push the Piston all the way into the Primary Base until the Piston bottoms against the last Brake Separator. Verify the Piston orientation by temporarily installing a Motor Assembly with Brake Conduit onto the Primary Base. If not properly aligned, the Motor Assembly Brake Conduit can be used to spin the Piston until the Motor Cover bolt holes align with the Primary Base threaded holes.

Install two new Backup Rings #514 into the Brake Conduit #510 glands. Slide both Backup Rings to the inside of their glands, towards the middle of the Conduit. Lightly grease two new Brake Conduit O-Rings #513 and install in the glands on the outside of the Backup Rings. Refer to the **PRIMARY ASSEMBLY DRAWING** to ensure that the Backup Rings are in the correct position relative to the O-Rings.

Gently push the Brake Conduit into the Piston port.

Install eight Brake Springs #520, leaving two empty spring cavities diametrically opposite each other.

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- **INSTALL PRIMARY ASSEMBLY (Refer to WINCH DRAWING)**

Position the Final Assembly #003 vertically, resting on its Final Base with the Bearing Holder facing up. Lower the Primary Assembly #002 into the Holder Bearing. Temporarily install four Spacer Bar Screws #430 and Washers #431. Do not secure screws with Threadlocker at this time.

Install Motor Assembly onto the Primary Base according to **INSTALL MOTOR ASSEMBLY**.

To ensure that the winch centerline is not distorted, position the Winch horizontally on a smooth, flat, clean surface. Secure the four Spacer Bar Screws #430 using the Threadlocker procedure described in **SECURING FASTENERS WITH ADHESIVES**. Tighten Screws in 1-3-2-4 sequence.

ASSEMBLE AND INSTALL FINAL ASSEMBLY

- **ASSEMBLE FINAL ASSEMBLY (Refer to FINAL ASSEMBLY DRAWING)**

Thoroughly clean and dry all components, particularly the threaded holes of the Spacer Bars #140.

Install the Relief Valve #109 into the outside of the Final Base #145 using Loctite #565 Sealant to seal the thread.

Position the Final Base flat with the male spline facing up.

If required, install a new Ball Bearing #125 into the Cable Drum #115 using the procedure described in **SECURING BEARINGS WITH ADHESIVES**. Ensure that the Bearing is fully pushed to the bottom of its seat. Lightly grease the bearing bore and press a new Shaft Seal #150 into the Cable Drum until the outside of the Seal case is flush with the Drum surface.

Carefully guide the Cable Drum onto the Final Base, engaging the Drum Bearing with the Final Base bearing pilot.

Install the Final Reduction #100 into the Cable Drum, ensuring that the female spline of the Final Carrier fully engages the male spline of the Final Base.

If required, install a new Sun Gear Stopper #850 into the Final Sun Gear #880 using Loctite #330 Acrylic to secure. If required, press a new Carrier Stopper #155 onto the Primary Reduction #101.

Install the Primary Reduction #101 into the Cable Drum, ensuring that the Final Sun Gear fully engages the Final Reduction.

If required, install a new Ball Bearing #125 into the Bearing Holder #130 using the procedure described in **SECURING BEARINGS WITH ADHESIVES**. Ensure that the Bearing is fully pushed to the bottom of its seat. Lightly grease the bearing bore and press a new Shaft Seal #150 into the Bearing Holder until the outside of the Seal case is flush with the Holder surface.

Lightly grease and install a new Holder O-Ring #112. Install the Bearing Holder into the Cable Drum. Install and secure the ten Bearing Holder Screws #110 using the procedure described in **SECURING FASTENERS WITH ADHESIVES**.

- **INSTALL FINAL ASSEMBLY (REFER TO WINCH DRAWING)**

Install Primary Assembly #002 onto the Final Assembly, #003 according to **INSTALL PRIMARY ASSEMBLY** instructions.

Inspect the Identification Label #410 and replace if damaged or difficult to read.

RE-MOUNT AND TEST WINCH

Re-mount the winch according to **INSTALLATION INSTRUCTIONS**. Always perform the safe test lift described in **INSTALLATION INSPECTION** after any winch service or maintenance.

MAINTENANCE

SPECIAL INSTRUCTIONS - REVERSING DIRECTION OF ROTATION

• GENERAL INFORMATION

WARNING

FAILURE TO PROPERLY INSTALL THE SPRAG CLUTCH COULD RESULT IN A WINCH BRAKE FAILURE AND ALLOW THE LOAD TO DROP, CAUSING PROPERTY DAMAGE, SEVERE INJURY OR DEATH. READ AND UNDERSTAND THE FOLLOWING INSTRUCTIONS BEFORE CHANGING THE DIRECTION OF HOISTING ROTATION OF ANY WINCH.

Refer to the following instructions to change a winch's direction of Cable Drum rotation when hoisting. For clarity, some information found elsewhere in this Manual is repeated below.

• DESCRIPTION OF BRAKE FUNCTION

The direction of Cable Drum rotation when hoisting is established by looking at the motor end of the winch. The standard counterclockwise hoisting winch is designated CC and the Cable Drum rotates in a counterclockwise direction when hoisting as viewed from the motor end of the winch (refer to **GENERAL DIMENSIONS**). A clockwise hoisting winch is designated CW and rotates in the opposite direction.

The Brake Sprag Clutch Cage allows the Brake Shaft to turn freely in the hoisting direction, independent of the winch brake system. In the lowering direction, the Clutch Cage locks the Brake Shaft to the winch brake system and holds the load. When lowering the load, the operator supplies hydraulic fluid to the Motor lowering port. Some of the hydraulic fluid is diverted to the Brake Piston to release the brake and allow the winch to drive in the lowering direction.

Two assemblies control the direction of rotation when hoisting and must be modified when reversing the winch's rotation:

• **MOTOR ASSEMBLY (Refer to MOTOR ASSEMBLY DRAWING)**

The Motor Shaft End Cover #272 is internally ported to supply hydraulic fluid to the Brake Piston when lowering and block hydraulic fluid when hoisting. A Pipe Plug #245 is positioned in the Motor Shaft End Cover depending on the required direction of rotation when hoisting. A specially marked Motor Assembly Screw #220 indicates the Motor's hoisting direction when viewed from the outside. Refer to **MOTOR ASSEMBLY DRAWING** to determine the correct Pipe Plug location and Motor Assembly Screw marking for the desired direction of rotation.

• **CLUTCH ASSEMBLY (Refer to CLUTCH ASSEMBLY DRAWING)**

The Clutch Assembly contains a Clutch Cage #370A positioned between two Clutch End Bearings #370B. The Clutch allows the Brake Shaft #310 to turn independent of the Brake Hub #340 when hoisting and locks the Shaft to the Hub when lowering. The Clutch Cage and End Bearings are oriented on the Brake Shaft depending on the required direction of rotation when hoisting. Refer to **CLUTCH ASSEMBLY DRAWING** to determine the correct Clutch orientation for the desired direction of rotation.

• PROCEDURE FOR REVERSING DIRECTION OF ROTATION

If attention is paid to cleanliness, the following procedure can be performed in the field without removing the winch from its mounting. If desirable to perform this service in the field, reduce spillage by draining half of the gear lubricating oil out of the Cable Drum before starting. Once completed, be sure to replenish the lubricating oil level according to **ADDING GEAR LUBRICATING OIL**.

It is always preferable to perform any winch service work in a clean, well lit, shop area.

MAINTENANCE

1. REVERSE MOTOR PIPE PLUG (Refer to MOTOR ASSEMBLY DRAWING)

Remove the Motor Assembly #001 according to **DISASSEMBLY INSTRUCTIONS - REMOVE MOTOR ASSEMBLY**. If practical, this is easier done with the winch positioned on end with the Motor facing up. Place the Motor Assembly with the Port End Cover #210 facing up and prevent the Motor from turning. Loosen, but do not remove the four Motor Assembly Screws #220. (If it is difficult to hold the Motor Assembly while loosening the Assembly Screws, leave the Motor mounted on the winch while starting to loosen the Screws.) Manually hold all the pieces together and turn the entire Motor Assembly over, placing it on its Port End Cover.

Lift the Shaft End Cover #272 up and off of the Motor Assembly. Clean and dry the Shaft End Cover, particularly the threaded bolt holes. Set it down with the threaded bolt holes facing up.

Remove the Pipe Plug #245 from its current location and install it in the opposite location using Loctite #565 Sealant to seal the thread. If uncertain, refer to **MOTOR ASSEMBLY DRAWING** to verify the correct location of the Pipe Plug and marked Motor Assembly Screw for the desired direction of rotation. Ensure that the Pipe Plug sits flush or below the machined Motor pad surface.

Replace the Motor Shaft End Cover onto the Motor Assembly. Ensure that the two Dowel Pins #270 remain in place.

Manually hold all the pieces together and turn the Motor Assembly over so that the Port End Cover again faces up. Install and secure the four Motor Assembly Screws using the procedure described in **SECURING FASTENERS WITH ADHESIVES**. Ensure that the Screw marked for visual identification is properly positioned. Tighten Screws to 31 ft-lbs [42N.m] in 1-3-4-2 sequence.

2. REVERSE SPRAG CLUTCH (Refer to CLUTCH ASSEMBLY DRAWING)

Remove the Brake Springs #520 and Brake Conduit #510. Remove Brake Piston #555, Clutch Assembly #500, Brake Separators #565 and Brake Discs #560 according to **DISASSEMBLE PRIMARY ASSEMBLY** instructions.

Take the Clutch Assembly and remove the Motor End Clutch Retainer #320. Clamp the two Clutch Thrust Washers #330 against the Brake Hub #340 and remove the Brake Hub #340, Sprag Clutch Cage #370A and End Bearings #370B together.

The Clutch Assembly direction of rotation is reversed by turning the Sprag Clutch Cage and End Bearings around end for end inside the Brake Hub. Refer to **ASSEMBLE CLUTCH ASSEMBLY** for warnings and instructions. If uncertain, verify the correct Clutch Cage and End Bearing orientation for the desired direction of rotation before proceeding. Replace the Clutch Thrust Washers with the grooves facing into the Clutch as shown. Carefully push the Brake Shaft through the Sprag Clutch Cage, End Bearings and Thrust Washers using a twisting motion. Secure with the Motor End Retainer.

Clean and dry all components, particularly the threaded holes of the Primary Base. Replace the Clutch Assembly, Brake Separators, Brake Discs and Brake Piston according to **ASSEMBLE PRIMARY ASSEMBLY** warnings and instructions. Replace the Brake Conduit and Brake Springs.

3. INSTALL MOTOR ASSEMBLY

Install the Motor Assembly onto the winch according to **INSTALL MOTOR ASSEMBLY** instructions.

4. REPLACE IDENTIFICATION LABEL (Refer to WINCH DRAWING)

The Identification Label #410 is located on the winch Final Base, but must not be altered outside of our factory. The Model Code identifies the direction of hoisting rotation. When changing a winch's rotation, contact Rotzler Inc. for a replacement Identification Label.

• RE-MOUNT AND TEST WINCH

Re-mount the winch according to **INSTALLATION INSTRUCTIONS**. Always perform the safe test lift described in **INSTALLATION INSPECTION** after any winch service or maintenance.

MAINTENANCE

SPECIAL INSTRUCTIONS - OPTIONAL STAINLESS STEEL SCREW KIT

• GENERAL INFORMATION

Refer to the following instructions to retrofit or service a Titan winch equipped with the optional Stainless Screw Kit.

Stainless steel screws are identified with "A4" on the head of the screw.

• DESCRIPTION OF STAINLESS SCREW KIT

Standard Rotzler Titan TH series winches are equipped with plated alloy steel screws. Stainless steel screws are optionally available for use in highly corrosive environments. New winches can be ordered with this option from the factory or existing winches can be retrofitted in the field. The stainless screw package consists of replacement Stainless Screw Kits for both the winch and the motor.

#210-095 TH1 WINCH STAINLESS SCREW KIT

REF.	COMPONENT	QTY.	DESCRIPTION
110	220-085*	10	Screw, Hex Hd Cap, M8-1.25x12mm, DIN 933, SS Gr A4
430	210-098	8	Screw, Hex Hd Cap, M10-1.50x30mm, DIN 933, SS Gr A4
431	220-101	8	Washer, M10, DIN 433, SS Gr A4
450	220-100	5	Screw, Hex Hd Cap, M10-1.50x25mm, DIN 933, SS Gr A4
451	220-101	5	Washer, M10, DIN 433, SS Gr A4

#220-111 STAINLESS SCREW KIT FOR M11-16 MOTOR (Standard)

220	220-113	4	Screw, Hex Hd Cap, M10-1.50x95mm, DIN 931, SS Gr A4
230	220-101	4	Washer, M10, DIN 433, SS Gr A4

* These standard fasteners are stainless steel as supplied and do not require replacement when upgrading with the Stainless Screw Kit.

• PROCEDURE FOR REPLACING EXISTING FASTENERS

Refer to **SERVICE INSTRUCTIONS** for general instructions before doing any winch service. Maintain the existing tension and alignment of the winch components by replacing one fastener at a time.

- Remove a single existing alloy screw and thoroughly clean and dry the threaded hole.
- Install and tighten the appropriate replacement stainless steel screw according to **SECURING FASTENERS WITH ADHESIVES** instructions.
- Repeat with all screws.

• SPECIAL TORQUE VALUE FOR MOTOR ASSEMBLY SCREWS

When using stainless steel Motor Assembly Screws, increase tightening torque to 37 ft-lbs [50 N.m].

• ORDERING REPLACEMENT SCREWS

The winch model number does not identify what types of screws appear on the winch. When ordering parts, it is therefore important for the customer to specify what screws are required from the Component numbers listed in the Assembly Drawings or from the preceding Screw Kit lists.