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TIDLAND

Tidland Series 860 Reel Spool Shaft Installation, Operation and Maintenance Manual



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SAFETY INSTRUCTIONS

Shaft design and performance are influenced by many dynamic variables. Load limitations include beam strength, deflection resistance, bearing centers, beam section, web width, and other critical elements. Never operate the shaft beyond the limits published in the Product Safety Data Sheet (PSDS) and in the following instructions. For other information, please contact Tidland Corporation.

1. Read and understand all instructions and shaft design application limits before operation.
2. Never use this product for a purpose or in a machine for which it was not specifically designed. See the PSDS.
3. Do not exceed the operation loads for this shaft as noted on its PSDS.
4. Follow all warnings and instructions marked on the product and on the PSDS.
5. Inspect the shaft for wear and/or other safety and functional deficiencies daily, before each use.
6. Wear safety glasses or proper eye protection when inflating or deflating or otherwise operating the air system.
7. Do not remove or otherwise alter any setscrews or fastening devices prior to using this product.
8. Do not operate this product if any setscrews or fastening devices are missing.
9. Only lift shaft using shaft-handling equipment designed for this product. Do not lift manually.
10. When removing a journal, always have the journal supported using a crane with safety straps.
11. When performing maintenance or repair procedures, the shaft must be completely supported.
12. For best results, all replacement parts used on this product should be original Tidland parts or to Tidland specifications.
13. All maintenance and repair procedures performed on this product should be done by qualified personnel to Tidland specifications.
14. Do not use hammer, forklifts, or other inappropriate and abusive tools to force shafts into tight cores or rolls.
15. Inflate the inserted shaft from 80-120 psi (5.5 – 8.2 bar) before operating in a roll or core.
16. Do not use finger to deflate the shaft.
17. Do not use this shaft if it will not inflate or will not hold air pressure during use.
18. Ensure the full length of the expanding gripping elements are covered by cores or rolls during expansion and use.
19. Store and handle the shaft carefully to avoid abuse and damage to the shaft.
20. Do not leave shafts lying on the floor in or near traffic areas.
21. Do not lose the Product Safety Data Sheet (PSDS) document. It should be located next to the operator station in clear view. If the PSDS is to be replaced, supply shaft serial number to Tidland.

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To view the Tidland *Tech Tips* maintenance video, visit <http://tidland.maxcessintl.com/winding/reel-spools>

CAUTION

Strict adherence to procedures is necessary to avoid injury.

- Wear eye protection when using tools or compressed air.



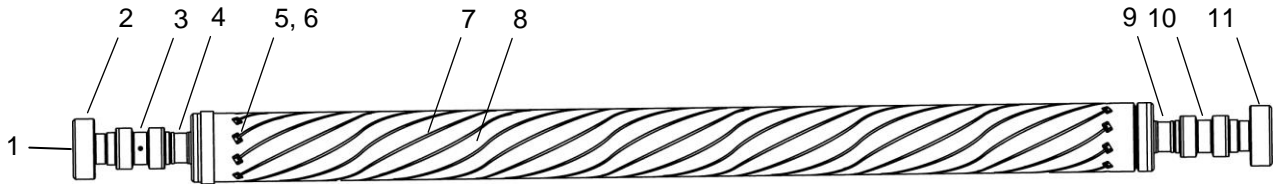
RECOMMENDED TOOLS

- Clean, non-lubricated air supply: 80-120 psi (5.4-8.2 bar) for proper operation.
- Hex drive wrenches
- Snap ring pliers
- Bladder hole punch (Tidland Part No. 560345)
- Hole punch guide (Tidland Part No. 577979)
- *AERVOE® Crown 8035 Slix-it* silicone spray (recommended)
- *LOCTITE® 243*
- *Lubriplate No.105* assembly lubricant (or equivalent)
- See *Tidland Winding Accessories* on page 17 for inflation tools.

NOMENCLATURE

Note:

Reel spool shaft configurations and nomenclature vary according to customer specifications.



- 1) Air Valve Assembly
- 2) Valve End Brake/Drive Hub
- 3) Valve End Bearing Assembly
- 4) Valve Journal
- 5) Element End Clamp
- 6) Socket Head Capscrew
- 7) External Rubber Element
- 8) Body
- 9) Non-Valve Journal
- 10) Non-Valve End Bearing Assembly
- 11) Non-Valve End Brake/Drive Hub

AIR SYSTEM REPLACEMENT PARTS

Please have your shaft serial number ready when calling Customer Service.

Tidland Part No.	Description
503911	Rubber Element
576711	Polyurethane Bladder
541362	Element End Clamp
525420	Socket Head Cap screw, M6 x 1.0 x 14 mm long
250452	Air Tubing, 0.078" ID
541307	Air Fitting, (THREADED) head
541306	Air Fitting, (THREADED) barb
Call for P/N	Valve

Inflating Shaft



Warning! Do not inflate while the shaft is spinning.
Disconnect the inflation tool before starting or moving the shaft.

Twist-Lock Valves

1. Use the Tidland Inflation Tool (P/N 631303).
2. Attach the inflation tool to the valve.
3. Push in on the valve face and turn the valve face to the fill/vent (green dot) position.
4. Using clean dry air, inflate the shaft to 80 psi (5.5 bar) minimum.

Warning! Do not exceed the maximum 120 psi (8.2 bar) air pressure.

Note:

- Make sure to inflate the shaft for at least 30 seconds to allow full inflation.
 - Keep the shaft pressure above 80 psi (5.5 bar) to help ensure safety and performance.
5. Turn the valve face to the closed (red dot) position before disconnecting the inflation tool.

Quick Release Valves

1. Use only the Tidland Inflation Tool (P/N 128052).
2. Push the air nozzle firmly into the valve receiver, which will depress both the valve button and the tip of the inflation tool.

Note:

- Make sure to inflate the shaft for at least 30 seconds to allow full inflation.
- Keep the shaft pressure above 80 psi (5.5 bar) to help ensure safety and performance.

Deflating Shaft



Warning! Do not deflate while the shaft is spinning.
Do not deflate with finger.

Twist-Lock Valves

1. Turn the valve face to the fill/vent (green dot) position.
2. Allow all the air to escape through the hole in the center of the button.
Note: Deflate the shaft for at least 30 seconds, or until the air from the element is completely exhausted.
3. Remove the shaft from the roll/core.

Quick Release Valves

1. Depress center of valve firmly to deflate.
Note: Deflate the shaft for at least 30 seconds, or until the air from the element is completely exhausted.

Preventive Maintenance

Tidland Customer Service is available to help you with spare parts or information about your shaft. Please have your shaft serial number available when you call.

General Shaft Care

Do not store shaft in inflated position.
Do not use petroleum-based products on element and bladder.
Keep the shaft clean, dry, and free of core dust build-up and debris.
Do not operate with fasteners missing.

Weekly Inspection

Check the air system function to ensure that:

- all elements expand
- rubber element is retained in slot
- rubber element collapses fully

Inspect the rubber elements for:

- cracks or fraying
- uneven wear
- excessive core dust build-up

Annual Inspection

Fasteners

Visually inspect for missing fasteners.

Use a torque wrench to check the torque on the following fasteners annually (or whenever other repairs are made). Refer to the shaft assembly drawing that was supplied with the operation and maintenance manual.

- Journals to the main shaft body
- Bearing end caps to bearing housings
- Element end clamps

Bearing Assemblies

Replace bearing grease annually; refer to the bearing assembly drawing that was supplied with the operation and maintenance manual.

Check bearings for proper amount of cold axial displacement; refer to the bearing assembly drawing that was supplied with the operation and maintenance manual.

Expanding Elements

Replace the poly bladder and external rubber element as needed.
Whenever replacing a rubber element, replace the poly bladder, also.

Recommended Spare Parts for Air System

See page 4.

Troubleshooting

See pages 15-16.

External Element

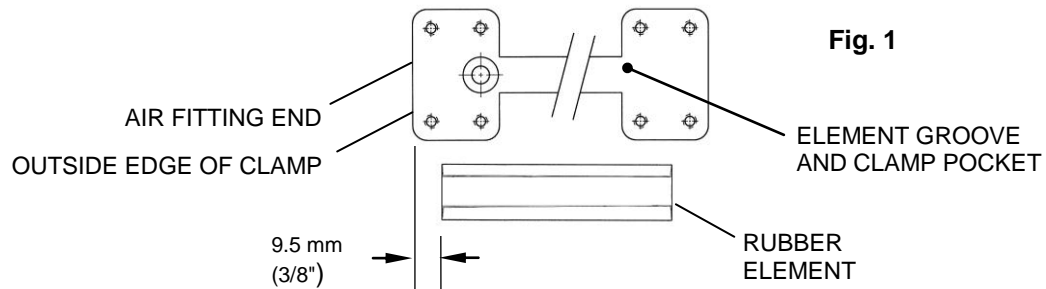
To view the maintenance tips video, visit <http://tidland.maxcessintl.com/winding/tidland-reel-spools>

Removing

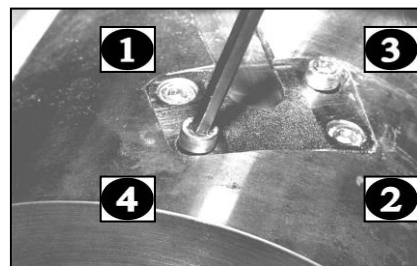
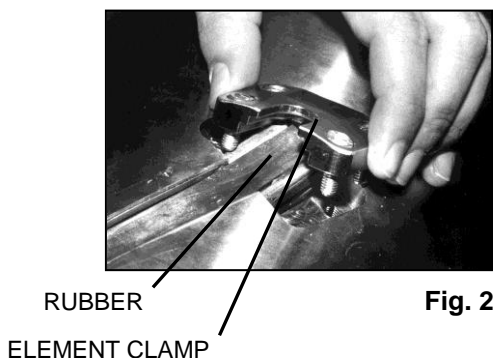
1. Deflate the shaft completely.
2. Remove the M6 socket head cap screws (5 mm wrench) from the element clamps at both ends of the element and remove the element clamps.
3. Pull the rubber element out from one end of the shaft element groove. See page 7 if the bladder needs to be replaced also. Tidland recommends replacing both at the same time.

Replacing

1. Spray the replacement (or existing) rubber element and shaft element groove liberally with a silicone lubricant.
2. Insert one end of the rubber element into the shaft element groove.
3. Pull on the inserted end of the element while pushing on the element to ease installation.
Note: More than one person may be required to install element depending upon the length of the shaft.
4. Position one end of the rubber element 9.5 mm (3/8") from the outside edge of the element clamp pocket of the air fitting end. (Fig. 1)
Note: If the rubber element is a replacement, the material supplied will be longer than the required finished length.



5. Remove all residual lubricant from the rubber element.
6. Hold the folded bladder and the rubber element in place and position the element clamp in the pocket. Make sure the bladder is positioned under the rubber element. (Fig. 2)
7. Apply *LOCTITE* 243 to threads of the M6 socket head cap screws.
8. Torque cap screws evenly to 10 Nm (7.4 ft-lbs) in the order shown in Fig 3.



Internal Element (Bladder)

Removing

1. Remove external rubber element (p. 7).
2. Lift the end of the polyurethane bladder and separate the air fitting components (head and barb) from the bladder. **Do not remove the air hose from the barb fitting.**
Caution! Do not let the air hose slip back inside the shaft body if the air hose is removed from the barb fitting. Wrap tape around the hose to prevent it from slipping through.
3. Pull the polyurethane bladder out from one end of the shaft slot.

Replacing

1. Prepare the new polyurethane bladder for installation.
Note: Material supplied will be longer than required finished length. Do not cut to size until Step 9.
2. Insert either end of the hole punch guide into the bladder and punch a 4 mm (5/32") diameter hole through the bottom wall of the bladder only. (Fig. 4)
3. Insert the air fitting into the hole from the inside of the bladder. (Fig. 5)

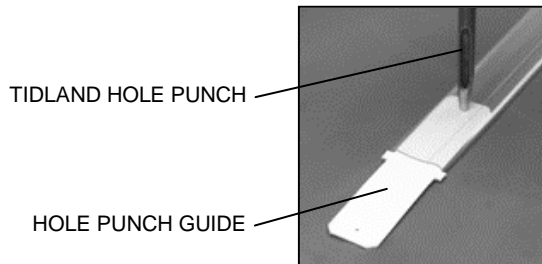


Fig. 4

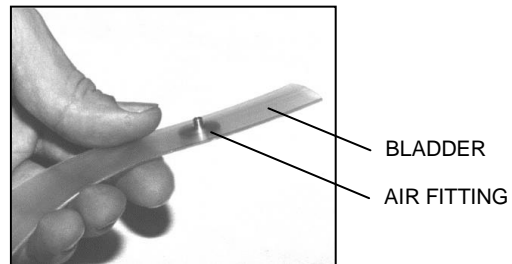


Fig. 5

4. Screw the air fitting and barb fitting together tightly. (Fig. 6)
5. Attach the air hose to the barb fitting, if removed. (Fig. 7)



Fig. 6

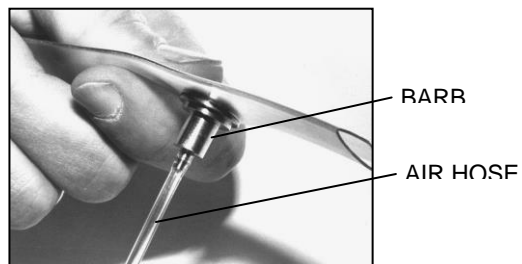


Fig. 7

6. Starting at the shaft end with the air valve hole, slide the non-air end of the bladder into the shaft element groove.

Internal Element (Bladder)

(Continued)

7. Seat the air fitting with barb fitting into the counterbored hole. (Fig. 8)

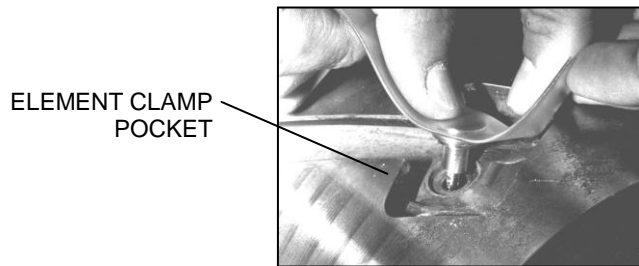


Fig. 8

8. **At the air fitting end**, fold under the end of the polyurethane bladder 13 mm (1/2"). (Fig. 9)

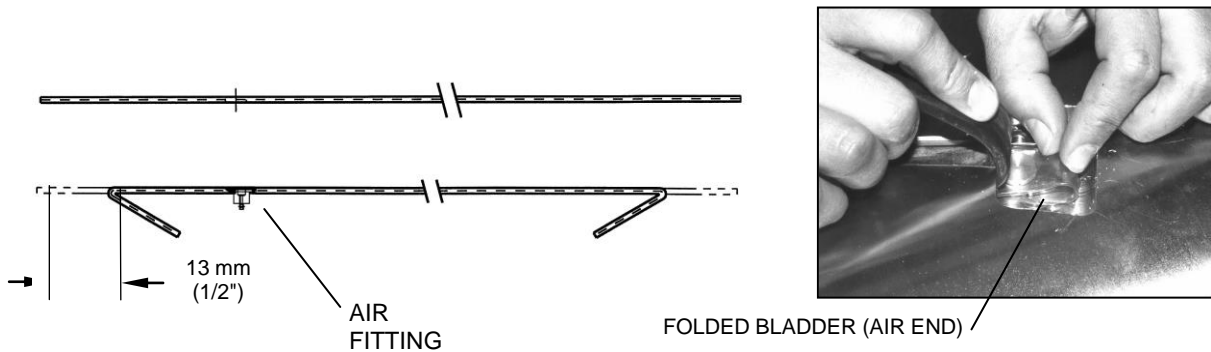
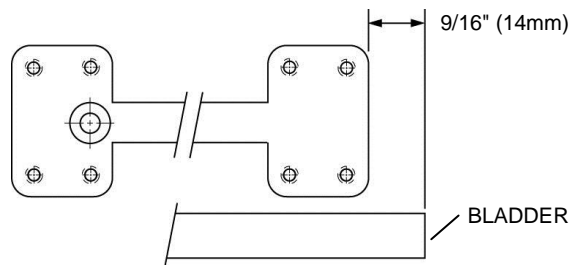


Fig. 9

9. At the non-air end of the shaft element groove, cut the polyurethane bladder 9/16" (14mm) **longer** than the outside edge of the element clamp pocket.
10. Fold under the remaining end (non-air) of the bladder 1/2" (13mm) as in Step 8 and position it in the element clamp pocket.
11. Reinstall external element (page 7).



Journals



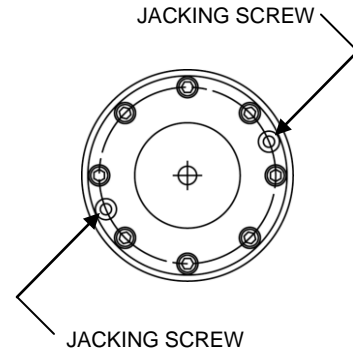
- For your safety, Tidland recommends removal of bearings, bearing housing and brake hub before removing journals.
- Use a hoist to support any component during removal or reinstallation .

**Proper realignment of all components during reassembly is critical to shaft balance.
Match mark all mating parts before removing any components.**

Removing

Non-Valve End Journal

1. **Match mark all mating parts before removing any components.**
2. Remove all components from the journal.
3. Use jacking screws to remove brake hub from the journal and the journal from the body.



Valve End Journal

1. Remove the isolation valve, using the instructions on page 11 that apply to your unit.
2. Follow Steps 1 through 3 above to remove the remaining components and the journal.

Reinstalling

Non-Valve End Journal

- Use *Lubriplate No. 105* (or equivalent) on all bolt threads before installation.
 - Torque all bolts to specifications on the Tidland Shaft or Bearing Assembly Drawings provided with this manual.
1. Register the journal on the shaft. Insert bolts into the journal.
 2. Tighten bolts to pull journal into shaft, then tighten bolts to the torque specifications for your shaft.
 3. Reinstall the inner bearing end cap, bearing and bearing housing.
 4. Adjust the axial play for the bearing (0.003"-0.005" end-play movement on the journal) when reinstalling the lock nut(s). Bend the lock washer tabs to lock the nut(s).
 5. Reinstall the outer bearing and bearing end cap.
 6. Tighten the bolts on the end caps, using torque specifications for your shaft.
 7. Register the brake hub on the journal.

Valve End Journal

1. Follow steps 1 through 6 as for the non-valve journal.
2. Reinstall the isolation valve (page 11).

Quick Disconnect Isolation Valve



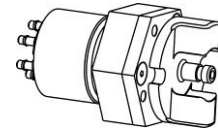
Deflate shaft completely before beginning valve maintenance.

Removing Valves

1. **6-way threaded valve:** Unscrew valve with 1¼" socket head wrench and remove.
6-way valve with adapter / 10-way valve: Remove snap ring from journal and pull out the valve.
Quick Release valves: Remove snap ring from journal. Thread a 5/16" fastener into valve and pull to remove the valve.
2. Remove air hoses from barbed air fittings.
3. Clip off 1/8" (3.2 mm) from the used end of the air hose to remove stretched or damaged hose.

Installing 6-Way Threaded Valve

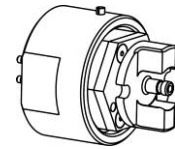
1. Ensure that any damaged air hose ends have been removed.
2. Secure air hoses onto the barbed air fittings.
Note: Ensure that each hose is attached to a barb fitting. Unused fittings will be capped or replaced with set screw at manufacturing.
3. Apply a thin layer of anti-seize compound to the outer surface of the valve body threads.
4. **Before inserting the valve,** rotate the valve body approximately eight revolutions counter-clockwise. (This prevents kinking the hose when threading the valve back into the shaft.)
5. Screw the valve securely into the shaft.



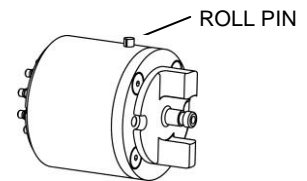
6-WAY THREADED VALVE

Installing 6-Way Valve (with Adapter) and 10-Way Valve

1. Ensure that any damaged air hose ends have been removed.
2. Secure air hoses onto the barbed air fittings.
Note: Ensure that each hose is attached to a barb fitting. Unused fittings will be capped or replaced with set screw at manufacturing.
3. Align roll pin with keyway in journal and insert valve completely.
4. Install snap ring into groove to secure valve.



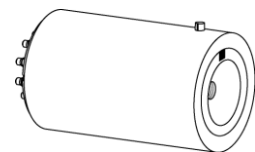
6-WAY VALVE WITH ADAPTER



10-WAY THREADED VALVE

Installing Quick Release Valve

1. Ensure that any damaged air hose ends have been removed.
2. Secure air hoses onto the barbed air fittings.
Note: Ensure that each hose is attached to a barb fitting. Unused fittings will be capped or replaced with set screw at manufacturing.
3. Align roll pin with keyway in journal and insert valve completely.
4. Install snap ring into groove to secure valve.

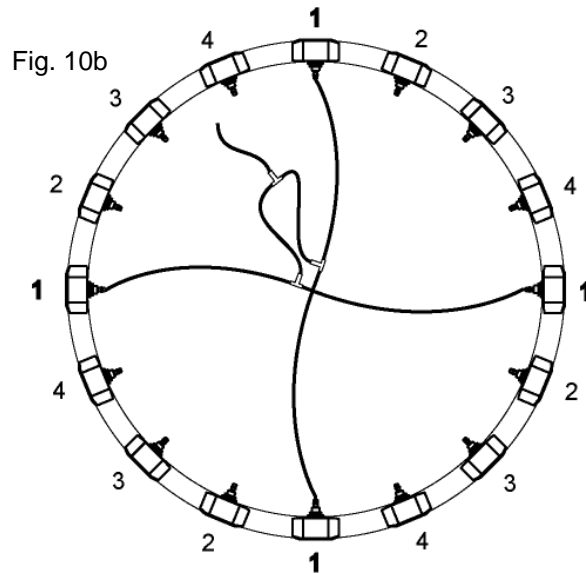
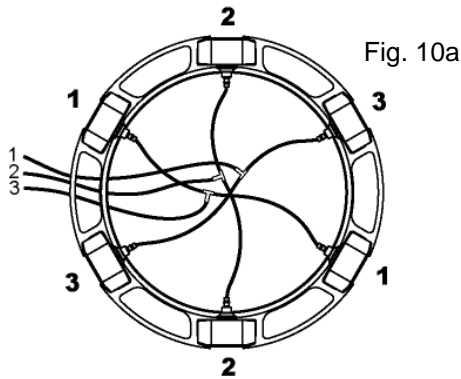


QUICK RELEASE VALVE

Air Circuits

Air circuits vary in configuration for the Tidland Series 800/850 shaft designs. In most cases, the air fitting at the end of each external element (underneath the element clamp) attaches to a hose inside the shaft.

- For single circuit valves, internal hoses attach to separate barbs on a plug installed either in the journal or on the side of the shaft. Air is delivered through the valve to the plug.
- Some single circuit shafts have no hoses. Air is routed through drilled holes from valve to the air fitting under the rubber elements.
- Isolation valves connect directly to the internal air hoses.
- Maintenance for some air circuit hoses may require removal of shaft journals.
- Hoses may feed out the end of the shaft into the journal or out the side of the shaft, depending upon the type of valve used. Wrap a piece of tape around exposed hoses to prevent them from slipping back inside the shaft body. (Journal removal may be required to retrieve them.)
- After removing an air fitting, always clip off the damaged end of an air hose before reconnecting it to the fitting.



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• **Fig. 10**

- "T-barb" hose connections are made inside the shaft. The number of connections depends upon how many external elements the shaft has. All connections should be made from opposing pairs of hoses and reduced to the minimum number of pairs needed for the 3-way or 4-way valve used, as shown in Fig. 10a and 10b.

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-
-
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- **Note:** Check air flow through hoses during assembly. Hose kinking can prevent inflation or deflation.

Bearings

Adjusting

1. Remove the bearing outer end cap.
2. Rotate the lock nut(s) to adjust the axial play of the bearing according to Timken® bearing specifications (0.003"-0.005" end-play movement on the journal).
3. Replace the bearing outer end cap.

Greasing

Tidland recommends the following:

- Grease according to the specifications on the Tidland Bearing Assembly Drawing included with your manual.
- For maximum fatigue life of the bearings, use grease **without an EP (extreme pressure) additive**.
- Too much grease will bind the bearings. 30% filled is normal.
- Apply grease to the following bearing fittings using a grease gun:
 - a. outer end cap
 - b. inner end cap
 - c. center of the bearing



MAINTENANCE

Bearings

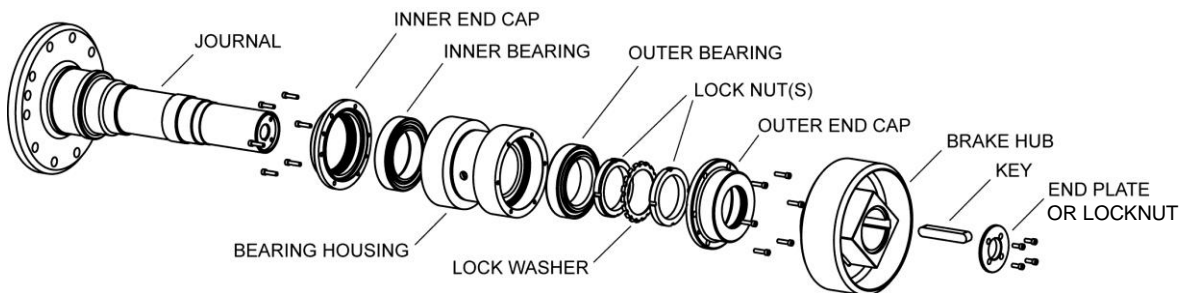
Removing



For your safety, use a hoist to support any component during its removal.

**Proper realignment of components during reassembly is critical to shaft balance.
Match mark all mating parts before disassembly.**

1. Match mark all mating parts.
2. Remove the end plate or locknut (depending on shaft configuration).
3. Remove the brake hub, using jacking screws.
4. Remove the outer end cap.
5. Bend the tab on the lock washer to allow removal of the lock nut(s).
6. Remove the lock nut(s).
7. Remove the bolts from the bearing housing inner end cap.
8. Remove the bearing housing.
9. If required, remove the inner race of the inboard bearing.



TYPICAL BEARING ASSEMBLY SHOWN. CONFIGURATIONS
MAY VARY ACCORDING TO CUSTOMER SPECIFICATIONS.

Reinstalling

**Proper realignment of components during reassembly is critical to shaft balance.
Use match marks to align parts during reinstallation.**

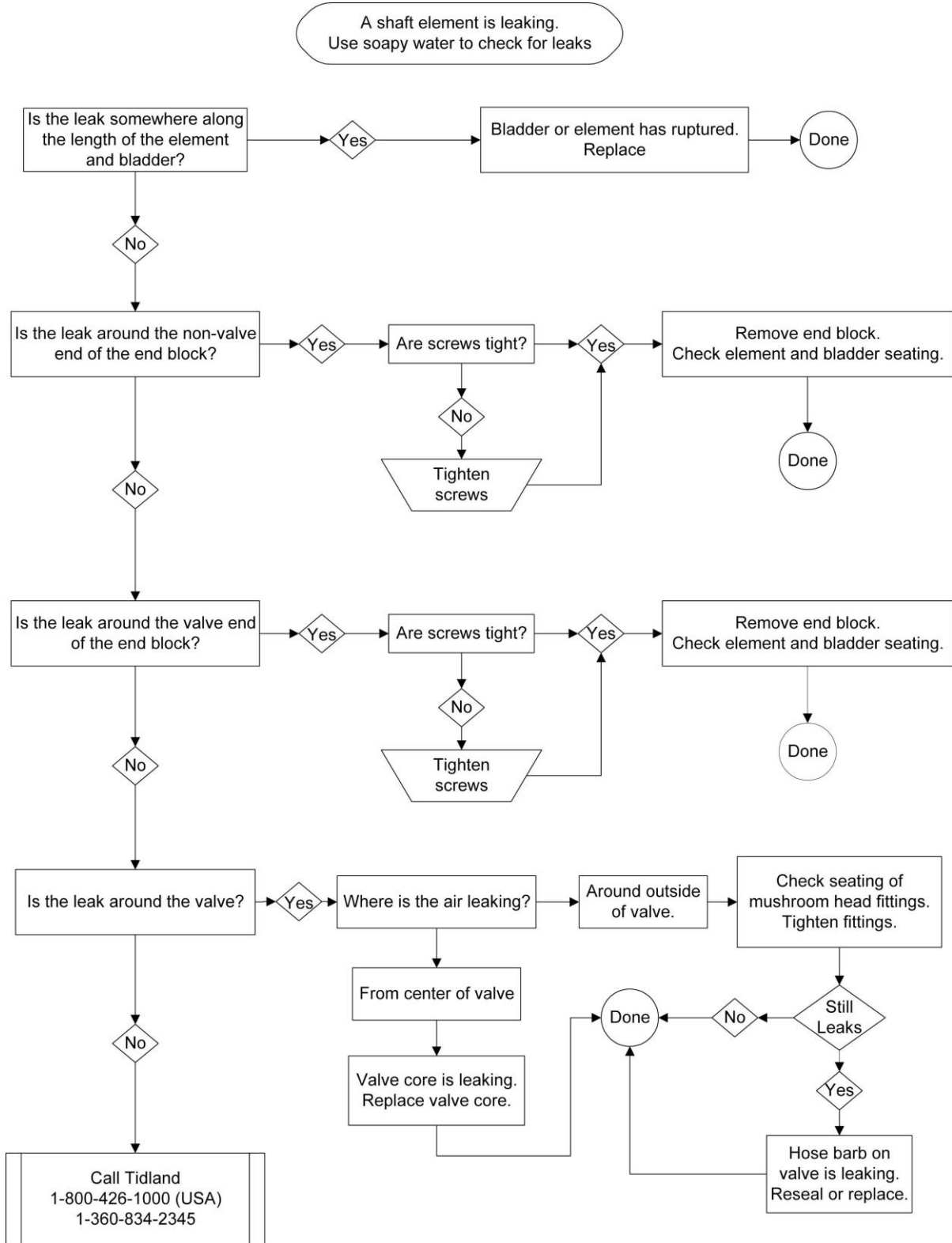
Notes:

- Use *Lubriplate No. 105* (or equivalent) on all bolt threads before installation.
 - Torque all bolts to specifications on the Tidland Shaft or Bearing Assembly Drawings provided with this manual.
1. If removed, reinstall the inner end cap and the inner bearing.
 2. Reinstall the bearing housing and outer bearing.
 3. Adjust the axial play for the bearing housing (0.003"-0.005" end-play movement on the journal) when reinstalling lock nut(s) and lock washer as shown in the illustration. (See *To Adjust Bearings* on page 13.)
 4. Reinstall the outer end cap.
 5. Reinstall bolts for end caps (6 plcs each) and torque to specifications for your shaft.
 6. Reinstall the brake hub and key.
 7. Reinstall the end plate or locknut. Torque bolts to specifications for your shaft.

TROUBLESHOOTING

Problem	Possible Cause	Recommended Solution
External element will not collapse completely in the middle of the shaft.	Fiber or dust buildup.	Remove rubber element and clean slot.
External element will not collapse near an element clamp.	Folded bladder ends too long	Remove element clamps and ensure that the cut ends of the folded bladder are within the boundaries of the element clamp pocket.
	Premature cold flow.	Replace the rubber element.
External element will not install in slot.	Buildup in slot.	Clean out the slot and lubricate the external element. Use a silicone lubricant spray.
Bladder is leaking at the element clamp.	Bladder is not folded over correctly in the element clamp pocket.	Review installation instructions in Maintenance section, p. 8.
	Hole punched in the bladder is oval or deformed.	Inspect bladder for possible cracks. Ruptures along the bladder length are typically located in the pocket area since the element seals the bottom of the slot.
	Element clamp is not tightened to torque specifications.	Torque to 7.4 ft-lbs (10 N·m).
External elements will not grip the core. Core slipping	Inflation pressure is incorrect	Check inflation pressure. Operate at 80-120 psi (5.5-8.2 bar)
	Element is leaking	Check for leaks. See page 16.
	Element is not expanding.	Check for leaks. See page 16. Check isolation valves to ensure that any unused air fittings are capped off.
	Core wrong size.	Confirm correct core size.

TROUBLESHOOTING AN AIR LEAK



TIDLAND WINDING ACCESSORIES

Air Inflation Tool

Tidland Air Inflation Tools are a fast and efficient way to inflate shaft and chuck elements for optimal performance. Available for quick-release (QR) or Schrader valves, and with or without air gauges.

Part Numbers:

128054 – QR	128055 – Schrader	631301 – QR; w/gauge; trigger style
128052 – QR; w/ gauge	128053 – Schrader; w/ gauge	631302 – Schrader: w/ gauge; trigger style
128088 – QR; tip only	126859 – Schrader; tip only	631303 – for Tidland Reel Spool; w/ gauge; trigger style w/ extension hose

Recoiling Air Hose

Attach this abrasion-resistant air hose to a Tidland Air Inflation Tool. Includes 1/4 NPT external **brass** fittings on each end. (1/4 x 12 ft.) Holds 150 psi (10.3 bar) pressure, maximum.

Part Number: 128155

Air Hose with Fittings

Attach this abrasion-resistant air hose to a Tidland Air Inflation Tool. Includes 1/4 NPT external **nylon** fittings on each end. (1/4 x 10 ft.) Holds 150 psi (10.3 bar) pressure, maximum.

Part Number: 600610

Air Release Tool

Tidland recommends using the Air Release Tool to help ensure operator safety when deflating shafts and chucks.

Part Number: 111630

Hole Punch and Locator Gauge

For use with Tidland external expansion element shafts, the Hole Punch and Hole Locator Gauges shorten maintenance downtime by ensuring correct hole locations and diameters in new bladders and elements without having to measure each one.

Part Numbers:

560345 – Hole Punch only	577979 – gauge; Tidland Reel Spool Shafts
133162 – Hole Punch Kit: includes hole punch and hole locator gauge (for one-piece rubber elements only)	577980 – gauge; folded bladder configurations
	577981 – gauge; Tidland Equalizer Model D4 Differential Shafts
	577982 – gauge; Tidland Series 800/850 Shafts
	647597 – gauge; Tidland Narrow Web Series Shafts

Journal Puller Assembly

The Journal Puller Assembly is extremely helpful for maintenance personnel when removing press fit journals. Fits 1-1/8–12NF tapped journals. Adapters are available.

Part Number: 132733

Mill Wedge

The Tidland Mill Wedge is made of tough ABS plastic and is primarily designed to separate paper rolls when web interweaving occurs.

Part Number: 127366

Chuck Interconnect Hose

Use this recoiling air hose to interconnect chucks on a mandrel or air shaft. Includes one male quick disconnect fitting at each end. Expands to 10 feet long.

Part Number: 513415 (use with female quick disconnect fitting P/N 512169)

TIDLAND WINDING ACCESSORIES

Quick Disconnect Fitting

For use with chuck interconnect hose. One per chuck. 1/8NPT threads

Part Number: 512169

Mark I Roll Saver

The Mark I Roll Saver is designed to restore 2-3/4" (70 mm) to 3" (76.2 mm) I.D. crushed cores with a manually operated hydraulic oil pressure pump. Up to 72" core penetration available – custom order.

Part Number: 700042 – 32" long unit

Mark I Roll Saver—Adapters

These adapters are available in three sizes and may be used in combination with the Mark I Roll Saver to restore 4" (101.6 mm), 5" (127 mm), and 6" (152.4 mm) crushed cores.

Part Numbers: 700026 – 4" (101.6 mm) core I.D.

700034 – 5" (127 mm) core I.D.

129871 – 6" (152.4 mm) core I.D.

Mark I Roll Saver—Sledge Weight

The Sledge Weight is a useful tool for driving the Mark I Roll Saver into difficult cores. It's better, simpler, and safer than any type of sledgehammer. Weight: 20 lb. (9 kg)

Part Number: 133144

Mark II Roll Saver

The Mark II Roll Saver is designed to restore 2-3/4" (70 mm) to 3" (76.2 mm) I.D. fiber cores. It is not recommended for steel or steel-tipped cores. 10" core penetration.

Part Number: 700066

Drive Coupling & Universal Joint Assemblies

A Drive Coupling (on the brake shaft) and Universal Joint (on the core shaft) with the Tidland Air Brake may be used for transmitting torque to maintain web tension and permit ease of shaft removal for roll changes.

Part Numbers:

128926 – Stationary Drive
Coupling (large)

600531 – Universal Joint

600920 – Journal Pin

128927 – Sliding Drive
Coupling (large)

600531 – Universal Joint

600920 – Journal Pin

128051 – Stationary Drive
Coupling (small)

128065 – Universal Joint

128064 – Journal Pin



**NORTH, CENTRAL
AND SOUTH AMERICA**

Tel +1.360.834.2345
Fax +1.360.834.5865
sales@maxcessintl.com
www.maxcessintl.com

INDIA

Tel +91.22.27602633
Fax +91.22.27602634
india@maxcessintl.com
www.maxcess.in

**EUROPE, MIDDLE EAST
AND AFRICA**

Tel +49.6195.7002.0
Fax +49.6195.7002.933
sales@maxcess.eu
www.maxcess.eu

JAPAN

Tel +81.43.421.1622
Fax +81.43.421.2895
japan@maxcessintl.com
www.maxcess.jp

CHINA

Tel +86.756.881.9398
Fax +86.756.881.9393
info@maxcessintl.com.cn
www.maxcessintl.com.cn

**KOREA, TAIWAN,
AND SE ASIA**

Tel +65.9620.3883
Fax +65.6235.4818
asia@maxcessintl.com