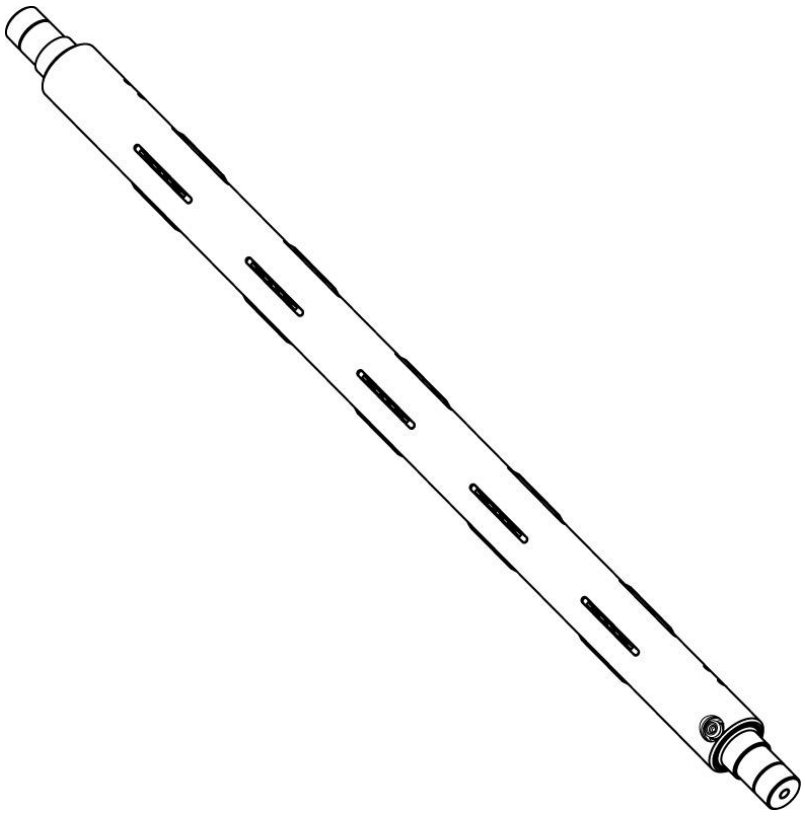
TIDLAND WINDING SOLUTIONS

MAXCESS®

TIDLAND

Tidland Internal Element Shaft

Installation, Operation and Maintenance Manual



EN

Metal Body

MI 132427 1 P

IMPORTANT SAFETY INSTRUCTIONS

When using this Tidland product, basic safety precautions should always be followed to reduce the risk of personal injury. Your company's safety instructions and procedures should always be followed. When using this product with any other equipment or machinery, all safety requirements stipulated by that equipment or machinery manufacturer must be followed. Compliance with local, state, and federal safety requirements is your responsibility. No part of these or the following instructions should be construed as conflicting with or nullifying the instructions from other sources. Be familiar with the hazards and safety requirements in your work environment and always work safely.

Read and understand all instructions and shaft design application limits before operation.

Never use this product for a purpose or in a machine that it was not specifically designed for. See Product Safety Data Sheet (PSDS).

Do not exceed the operation loads for this shaft as noted on its PSDS, Product Safety Data Sheet.

Follow all warnings and instructions marked on the product and on the PSDS.

Do not use fingers or other objects to deflate the shaft; Tidland recommends using the Tidland Air Release Tool (see page 5).

Inspect the shaft for wear and/or other safety and functional deficiencies daily, before each use.

Wear safety glasses or proper eye protection when inflating or deflating or otherwise operating the air system.

Do not remove or otherwise alter any setscrews or fastening devices prior to using this product.

Do not operate this product if any setscrews or fastening devices are missing.

Do not lift shaft manually if it is beyond your capacity. Loads over 1/3 your body weight may be prohibitive. Consult your company safety policy.

When lifting a shaft, use proper lifting techniques, keeping back straight and lifting with the legs.

Do not carry or lift this product over wet or slippery surfaces.

Use appropriate mechanical lifting devices, such as a hoist or shaft puller, for heavier shafts.

When performing maintenance or repair procedures, do not pressurize the shaft if journal setscrews are loose or missing.

When performing maintenance procedures, do not pressurize the shaft if the journal is missing.

All replacement parts used on this product should be made to original Tidland specifications.

All maintenance and repair procedures performed on this product should be done to Tidland specifications by qualified personnel.

NOTICE

- If shafts with rubber air systems are stored longer than two weeks - store them completely deflated, away from electric motors, away from direct sunlight or florescent light, and in temperatures not exceeding 85ºF (29ºC).
- When storing shafts with constant air pressure, the rubber air systems are subject to distortion or cold flow.

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CUSTOMER SERVICE

360.834.2345 www.maxcessintl.com

Visit the Maxcess Repair and Return Center online to review our return policies or to submit an electronic Return Material Authorization Request.
www.maxcessintl.com/returns

RECOMMENDED TOOLS

- Clean, dry, non-lubricated air supply: 80-120 psi for proper operation.
- Tidland Inflation Tool (Part No. 128052)
- Tidland Air Release Tool (Part No. 111630)
- Pincers for removing hose clamps, if installed. See page 12.
- *Dow Corning Molykote® 55* o-ring grease
- Low-strength threadlocker (*Loctite® 222 or equivalent*)
- Thread sealant (*Loctite® 545 or equivalent)*

For more accessories to help with your winding processes, visit *www.maxcessintl.com*.

SHAFT INSPECTION GUIDELINES

Upon Receipt

Before placing shaft in service, check visually for any damage due to shipping or mishandling. Track each shaft individually by recording its serial number and when it went into service.

Before Each Use

Inspect the shaft daily for wear and/or other safety and functional deficiencies. Check for damaged or missing fasteners.

Body

- Visually check for any damage, gouges or excessive wear.
- Check for cracks around lug and pad slots..

Journal

- Visually check for cracks or excessive wear.

If any of these problems are found, remove shaft from service and call Tidland Customer Service.

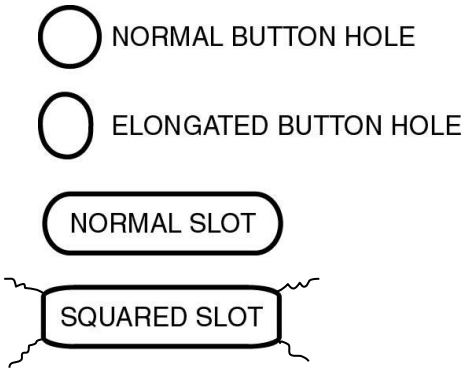
After One Year

Body

- Inspect lug slots or button holes for excessive wear. Check elongation of button holes or for squaring out at the corners of the lug slots where cracks can develop.

Journal

- Check for reductions in transitional radii between journal diameter steps. If wear is observed, check for cracks. Use magnetic-particle or dye-penetrant, or an equivalent procedure, to detect surface cracks. Measure diameters at those locations where journal, or body, rides on bearings. Measure diameter at those locations where the edges of mounted rolls ride on the shaft body, watching for diameter reduction of 0.015" (0.4 mm) or more.



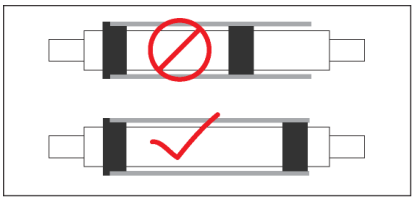
If any of these problems are found, remove shaft from service and call Customer Service.

These guidelines do not, in any way, extend or modify the Tidland Product Warranty.

CAUTION

- Wear eye protection when using tools or compressed air.

- **Never operate the shaft beyond the limits published in the PSDS and in this document.** Core shaft design and performance is influenced by many dynamic variables. Load limit considerations: beam strength, deflection resistance, bearing centers, beam section, web width, and other critical elements. For other information contact Customer Service.



When using chucks on this shaft, always locate chucks as shown.

Improper placement of chucks will reduce life cycle of the shaft.

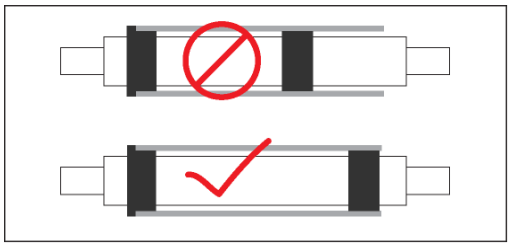
Questions about installation, application or load calculations? Call Customer Service.

Do not inflate rubber tube assembly outside of the shaft.
Tube fittings could disengage from assembly and become dangerous projectiles.
May result in serious injury.

Do not inflate pad shafts unless all pads are under a core or web.
Pads can be ejected from the shaft when inflated.
May result in serious injury.

Removal or modification of components can affect shaft balance.
Call Tidland to confirm whether your shaft was factory-balanced during manufacturing.

INSTALLATION



Install shaft as required for your application.

When using chucks on this shaft, always locate chucks as shown.

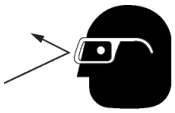
Improper placement of chucks will reduce life cycle of the shaft.

OPERATION

- Keep the Tidland Air Shaft clean and dry.
- Make sure that there are no scratches or burrs on the shaft body.
- Wear eye protection when using tools or compressed air.
- Keep the shaft pressure above 80 psi (5.5 bar) to ensure optimal safety and performance.

To Inflate Shaft

Do not inflate pad shafts unless all pads are under a core or web.
Pads can be ejected from the shaft when inflated.



1. Use the Tidland Inflation Tool. Push the air nozzle firmly into the valve receiver, depressing both the valve button and the tip of the inflation tool.
2. Inflate the shaft until the line pressure air gauge indicates a minimum of 80 psi (5.5 bar). Do not exceed the maximum air pressure of 120 psi (8.3 bar).

To Deflate Shaft

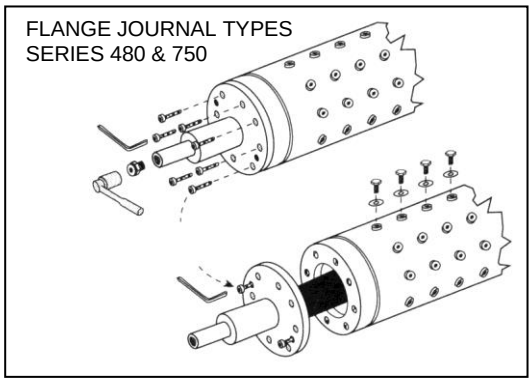
Only use the air release tool.
Do not use finger to release air.
Do not deflate while the shaft is spinning.

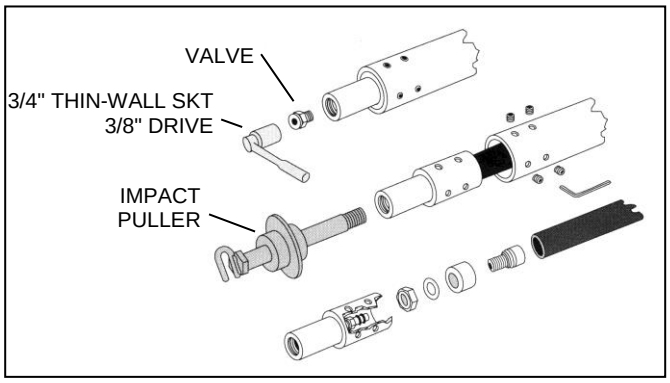
1. Using air release tool, push in the quick release air valve allowing the air to escape through the hole in the center of the button.

MAINTENANCE

Read First

- Shaft design configurations vary.
- Series 650 and 750 have screw-on external leaves. They do not need to be removed for tube maintenance.
- To remove journals from Series 480 and 750 shafts, remove the large flange bolts and place them in the two jacking screws holes to move the journal out of the register. Other shaft types require the use of an impact puller.

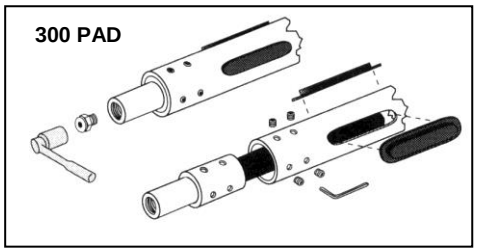


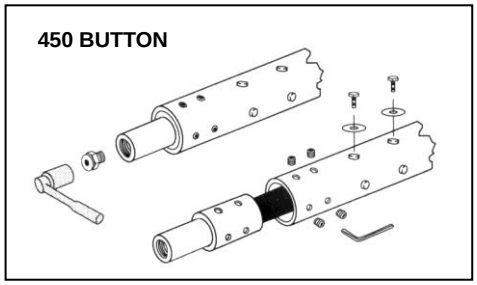


Removing the Rubber Tube Assembly

Omit Steps 1 and 2 for Series 300 pad shafts.

1. Inflate shaft to raise elements.
2. Place retaining fasteners in lugs or buttons. (Fig. 1)
3. Deflate shaft. **Remove ALL Air!** (Pads, if used, will fall inside shaft body. Remove later along with rubber tube.)
4. Remove valve.
5. Match mark the valve journal and body before removing the set screws.
6. Remove the set screws.
7. Using a round clamping fixture to protect the shaft body, lock the shaft in a vise. (Fig. 2)
8. Attach the impact puller/slide-hammer to valve journal end and strike the weight against stop.
9. After removing valve journal, pull out the element.
10. Rubber tube fittings can now be disassembled and reused.
11. This rubber tube assembly consists of four basic parts: element, element fitting, end cap and jam nut. (Older models may have a washer installed: it is no longer necessary with the use of *Loctite 242.)* See page 11.





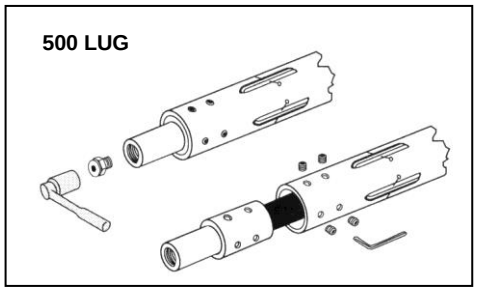
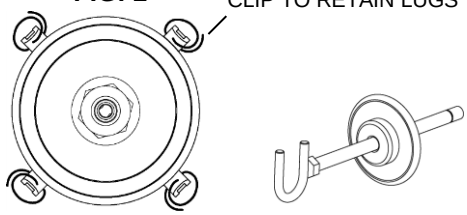


FIG. 1



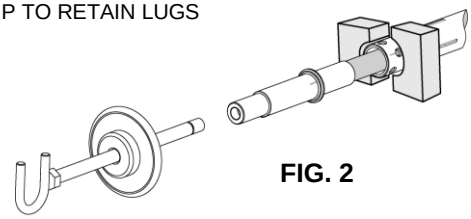


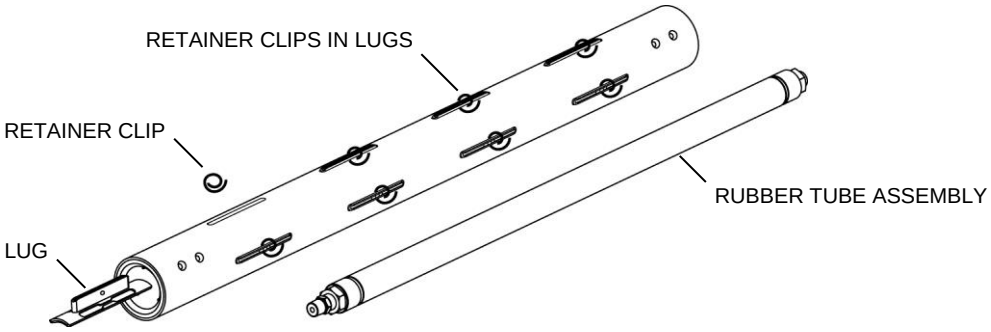
FIG. 2

Replacing the Outer Lugs

With the rubber tube removed (page **9**), the outer lugs (at ends of shaft) can be replaced.

1. With the retainer clips in place, remove and replace **one lug at a time**. Install a retainer clip on the new lug before proceeding to the next lug.
2. Follow instructions *To Install Complete Rubber Tube Assembly,* page 11.
   Note: Lugs will jam inside shaft body if clips are removed more than one at a time.

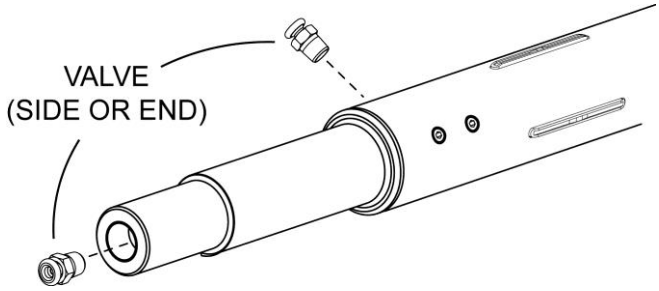
   To Replace All Lugs: Tidland recommends returning the shaft for factory service.



Replacing a Valve

Shaft configurations vary. Valve may be installed in the end of the shaft or along its face.

1. Deflate the shaft. Remove all air.
2. Locate and remove the valve.
3. Apply thread sealant (according to manufacturer's directions) to the threads of the valve (unless the sealant is pre-applied)l.
   NOTE: Valves with pre-applied thread sealant are good for multiple uses. Always inspect the valve threads for sufficient sealant; do not reuse more than six times.
4. Screw the valve into the shaft and torque to 8.8-10 ft·lbs (12-13.6 Nm).



Rubber Tube Fitting Designs

If your replacement rubber tube assembly looks like this ==========>>>

Remove your old rubber tube assembly (page 9) and install the new one, pushing the tube assembly firmly onto the o-ring connector in the journal.

If you are using re-using your tube fittings with bulk rubber tube material, see instructions starting on page 14.

If your replacement rubber tube assembly looks like this ==========>>>

=== it is directly interchangeable with older shaft designs. There are fewer parts: rubber tube, tube fitting and hose clamp, pictured at right.

Remove your old rubber tube assembly (page 9) and install the new one, pushing the tube assembly firmly onto the o-ring connector in the journal.

See page 12 for using the hose clamp design with bulk rubber tube material.

New shaft design

Tidland's new shaft designs have a hole bored in the journal to accept the rubber tube assembly with a male o-ring connector, pictured at right.

Remove your old rubber tube assembly and install the new one, pushing the tube assembly firmly into the socket in the journal.

See page 12 for using the hose clamp design with bulk rubber tube material.

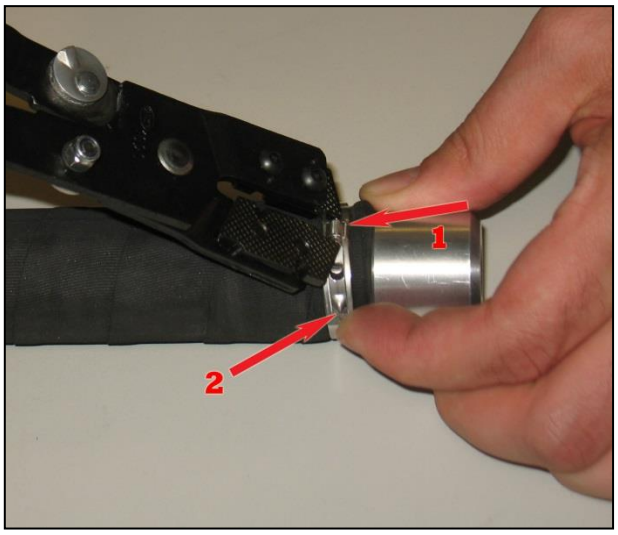
Using the new fitting design with bulk rubber tube material

Removing the hose clamp

Tidland recommends the use of a pincer for safe and easy removal of the hose clamp.

Standard pincer	Tidland Part No. 778957
Spring return pincer	Tidland Part No. 778958

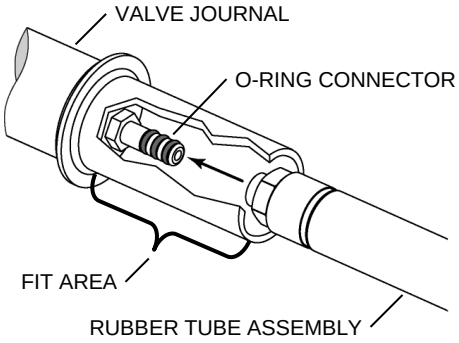
1. With the pincer, squeeze the tangs **(1)** on the hose clamp until you can lift the load retaining hook **(2)**, and then release the pincer.
2. Remove the fittings and use them again with new rubber tube material. (Remember to reinstall the tube stiffener, if needed.)
3. To close the clamp, squeeze the tangs until you can snap the load retaining hook into place.



Installing a Complete Rubber Tube Assembly

Note:
O-ring connector configurations vary. Make sure there is an o-ring in each groove before re-assembly.

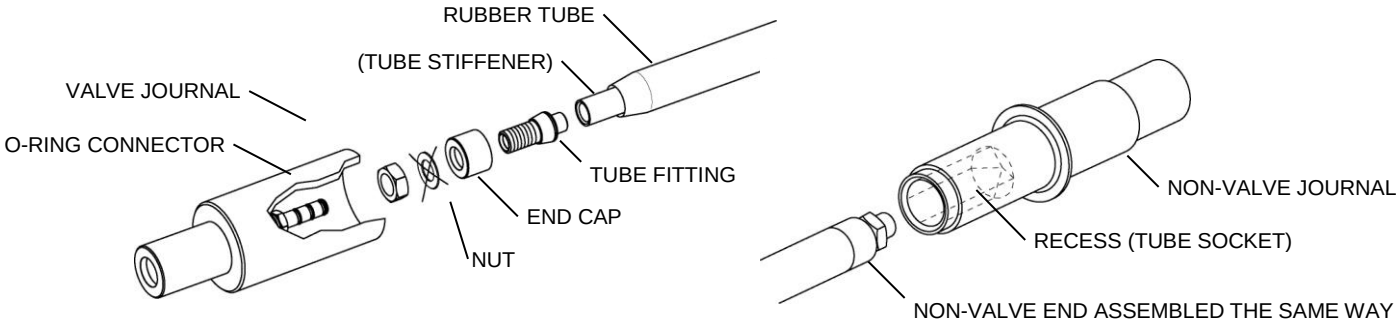
1. Apply o-ring grease to the o-rings on the o-ring connector. Push the valve end tube fitting fully over the o-ring connector in the valve journal.
   NOTE: If replacing the o-ring connector, use a thread sealant (liquid or pre-applied).
2. Insert the non-valve end of the rubber tube assembly into the shaft. Slide it all the way in until it seats in the recess in the non-valve journal.
3. Apply o-ring grease to the fit area of the valve journal.
4. Align the match marks on journal and shaft and tap the journal into place with a rubber mallet.
5. Apply small amount of *low-strength* threadlocker to threads of the journal screws. Reinstall the set screws and torque according to chart on page 15.
6. Reinstall the valve and torque to 8.8-10 ft·lbs (12-13.6 Nm).
   Pad Shafts: Push pads into slots from outside the shaft. A **very small amount** of air in the rubber tube will help keep the pads seated during installation.



Disassembling the Rubber Tube Assembly

- This assembly consists of four parts: rubber tube element, tube fitting, end cap and jam nut. Some assemblies also include a tube stiffener or, for tubes 11/16" and under, a wooden dowel inside the tube that aids in loading the assembly into the shaft.
- Older assemblies may have a washer, which is no longer necessary if using *Loctite 242* on tube fitting hardware.
- All fittings can be reused with new rubber tube material: if any parts are rusted or worn, Tidland recommends replacing the entire air system.

1. Remove the nut from the valve end of the rubber tube assembly.
2. Pull the end cap off of the tube.
3. Remove the tube fitting from the tube and disconnect the tube stiffener (if installed).



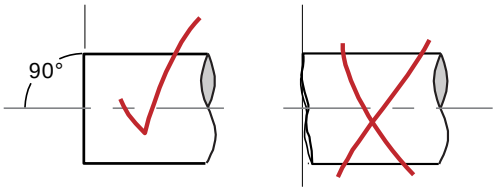
Note the difference in tube fittings

- Valve end fittings are bored through for air passage: non-valve fittings are solid.
- O-ring connector configurations vary. Make sure there is an o-ring in each groove before re-assembly.

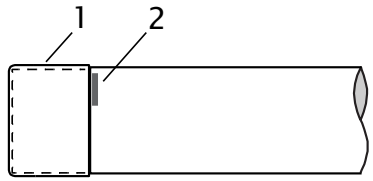
Do not inflate rubber tube assembly outside of the shaft.
Tube fittings could disengage from assembly and become dangerous projectiles.
Can result in serious injury.

Building the rubber tube assembly

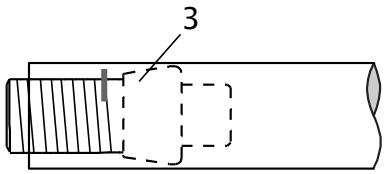
- When cutting rubber tube to length, it is very important to cut the ends square, without nicks or wavy edges. Heavy tin snips work well. Any uneven cuts will not let the rubber tube seat properly in the end cap, resulting in an unreliable assembly subject to failure under pressure.
- Before assembly, clean ends of rubber tube inside and out to make sure all mold release agents or other foreign coatings are removed. This will help prevent the rubber tube from squeezing out of the cap when the retaining nut is tightened.



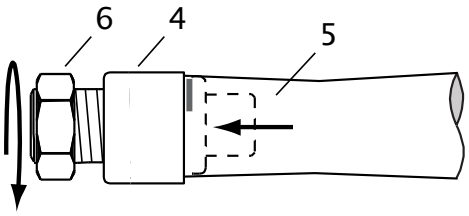
1. Cut rubber tube square at each end.



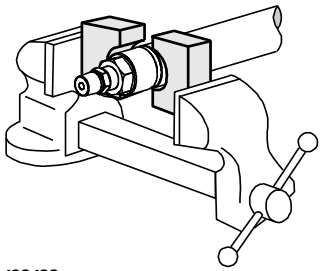
2. Install the end cap **(1)** on the rubber tube and mark its position on the tube **(2)**. Remove the end cap.



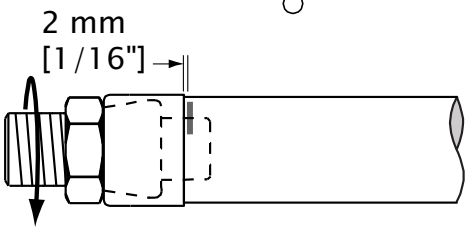
3. Insert the tube fitting **(3)** deep inside the rubber tube.



4. Fit the end cap **(4)** over the tube.
5. Squeeze the tube **(5)** to force the tube fitting back toward the end.
6. Apply Loctite to the tube fitting threads and install the nut **(6)**. Do not tighten.



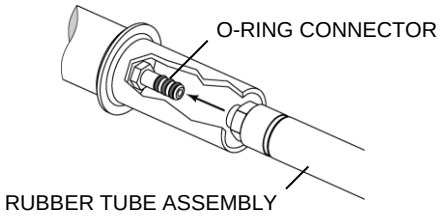
7. Secure the shaft in a round clamping fixture.



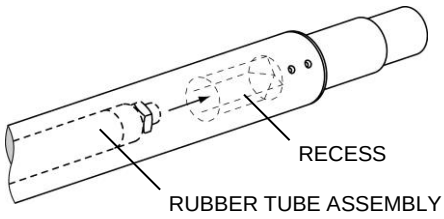
8. Tighten the nut to draw the tube fitting out until fully seated in the end cap.
9. Tighten the nut to torque specified on page 15.
10. The end cap must be within 2 mm of the mark on the rubber tube. Tube fitting threads should be perpendicular to the rubber tube. If crooked, loosen the nut and repeat the procedure.
11. Repeat the procedure for the non-valve end.

Shaft Assembly Sequence

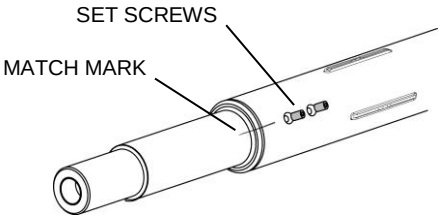
Note:
O-ring connector configurations vary. Make sure there is an o-ring in each groove before re-assembly.



1. Apply o-ring grease to the o-rings on the o-ring connector.
2. Insert the rubber tube assembly into the valve journal and push the valve end tube fitting fully over the o-ring connector in the valve journal.
3. Apply o-ring grease to the fit area of the valve journal.



4. Insert the non-valve end of the rubber tube assembly into the shaft. Slide it all the way in until it seats in the recess (tube socket) in the non-valve journal.
5. Align the match marks on valve journal and shaft and tap the journal into place with a rubber mallet.
6. Apply small amount of *low-strength* threadlocker to threads of the journal set screws. Reinstall the set screws and torque as shown in the chart below.
7. Apply a thread sealant (according to the manufacturer's directions) to threads of the valve (unless the sealant is pre-applied).
   NOTE: Valves with pre-applied thread sealant are good for multiple uses. Always inspect the valve threads for sufficient sealant; do not reuse more than six times.
8. Screw the valve into the shaft and torque to 8.8-10 ft·lbs (12-13.6 Nm).



Setscrew Torque Requirements					
Size US	**ft·lbs steel body**	**ft·lbs aluminum body**	**Size** Metric	**Nm steel body**	**Nm aluminum body**
1/4"	6-7	2-3	**M6**	9-10	3-4
5/16"	12-14	4-5	**M8**	16-18	5-6
3/8"	22-24	7-8	**M10**	30-32	10-11
1/2"	47-52	15-17	**M12**	62-69	20-23

Assembly Torque Requirements for Standard Tube Fittings			
Tube O.D.	**ft·lbs**	**Tube O.D.**	**Nm**
1-1/4"	28-30	**32 mm**	38-41
1-3/8"	38-40	**35 mm**	51-54
1-1/2"	43-45	**38 mm**	58-61
1-5/8"	43-45	**41 mm**	58-61
1-7/8"	48-50	**48 mm**	65-68
2-1/8"	53-55	**54 mm**	72-75
2-3/8"	58-60	**60 mm**	79-82
3-3/8"	63-65	**86 mm**	85-88
4"	68-70	**102 mm**	92-95
4-3/8"	78-80	**111 mm**	105-108
4-1/2"	78-80	**114 mm**	105-108

TROUBLESHOOTING

Problem	Possible Cause	Recommended Solution
Shaft will not inflate or hold air	Leaking rubber tube assembly	Disassemble shaft and replace rubber tube assembly.
	Valve leaking	Remove valve and apply a thread sealant* according to manufacturer's directions. Reinstall valve and torque to 8.8-10 ft·lbs (12-13.6 Nm). Replace valve if necessary. (Note: replacement valves may have pre-applied thread sealant.)
	Rubber tube fitting slips off o-ring connector	O-ring connector configurations vary. Make sure there is an o-ring in each groove. Use o-ring grease. **Always use a thread sealant when replacing or reinstalling o-ring connectors.**
	Hose clamps not secure (new design, p. 11)	Make sure the load retaining hook is locked. (p. 12)
Lugs fall through slots	No tube stiffener	Call Tidland for recommendation.
	Rubber tube lies flat when not inflated.	
Cores slipping	Low air pressure	Operate shaft at 80 psi minimum (5.5 bar) for optimal performance.
	Air leak	Check rubber tube assembly for leaks and replace or repair as needed. Check valve for leaks. Remove valve and apply a thread sealant* according to manufacturer's directions. Reinstall and torque to 8.8-10 ft·lbs (12-13.6 Nm). Replace valve if necessary. (Note: replacement valves may have pre-applied thread sealant.)
Journals wear prematurely	High loads or speeds	Check PSDS specifications for your shaft application. Verify that journals are hardened.
Excessive shaft vibration	Shaft imbalance	Return shaft to Tidland for dynamic balancing.

* Valves with pre-applied thread sealant (from manufacturer) can be re-used up to six times.

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