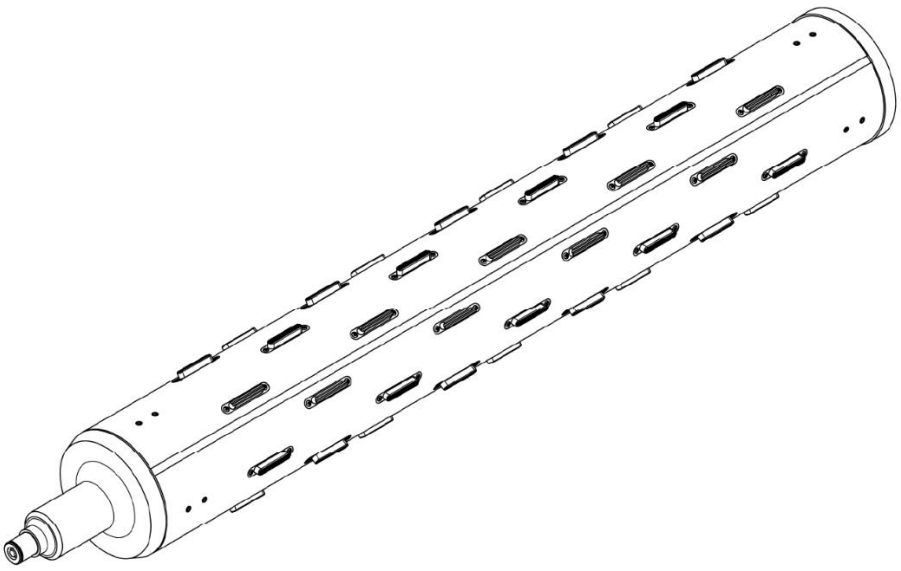
TIDLAND WINDING SOLUTIONS

A MAXCESS BRAND

560 PM Great Expansion Shaft

User Guide



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Safety Instructions

When using this Tidland product, basic safety precautions should always be followed to reduce the risk of personal injury. 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.

Read and understand all instructions and shaft design application limits before operation. Never use this product for a purpose or in a machine it was not specifically designed for. See Product Safety Data Sheet (PSDS) for more information.

- Do not exceed the operation loads for this shaft as noted on its PSDS.
- 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.
- Inspect the shaft for wear and/or other safety and functional deficiencies before each use.
- Wear safety glasses or proper eye protection when 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.

If shafts 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, rubber components are subject to distortion or cold flow.

Recommended Tools

- Clean, dry, non-lubricated air supply: 80-120 psi for proper operation.
- Tidland Inflation Tool (Part No. 27L128052)
- Tidland Air Release Tool (Part No. 27L111630)
- Dow Corning Molykote® 55 O-ring grease
- Medium-strength thread locker (Loctite® 243 or equivalent)
- Thread sealant (Loctite® 545 or equivalent)

Accessories

- Tidland 560PM Removable Pull Rod for Manual Retraction (Part No. 270042114)
- Tidland 560PM corestop assembly 8in (Part No. 270044448)
- Tidland 560PM corestop assembly 10in (Part No. 270040252)
- Tidland 560PM corestop assembly 12in (Part No. 270044449)

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

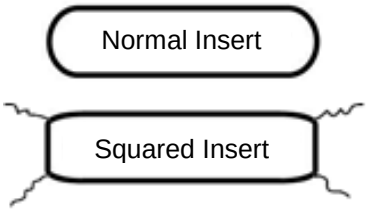
- Visually check for cracks or excessive wear.

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

After One Year

Body

Inspect lugs and bronze inserts for excessive wear.



Journal

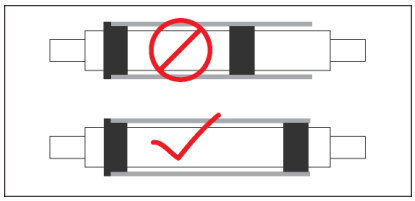
Check for reductions in transitional radii between journal diameter steps. If wear is observed, check for cracks. Use magnetic-particle or dye-penetrant, or an equivalent procedure, to detect surface cracks. Measure diameters at those locations where journal, or body, rides on bearings. Measure diameter 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 Product Warranty.

Cautions

- 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.



- 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 shaft without both journals installed and all set screws tightened. Air piston can push shaft apart if not retained by journals.
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.

- Keep the Tidland Air Shaft clean and dry.
- Make sure that there are no scratches or burrs on the shaft body.
- Keep the shaft pressure above 80 psi (5.5 bar) to ensure optimal safety and performance.
- Shafts may have manual valves, or a port for connection to controlled air supply from the machine.

To Inflate Shaft

- For shafts with manual valves: using 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.
- 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

To Deflate Shaft

Only use the air release tool

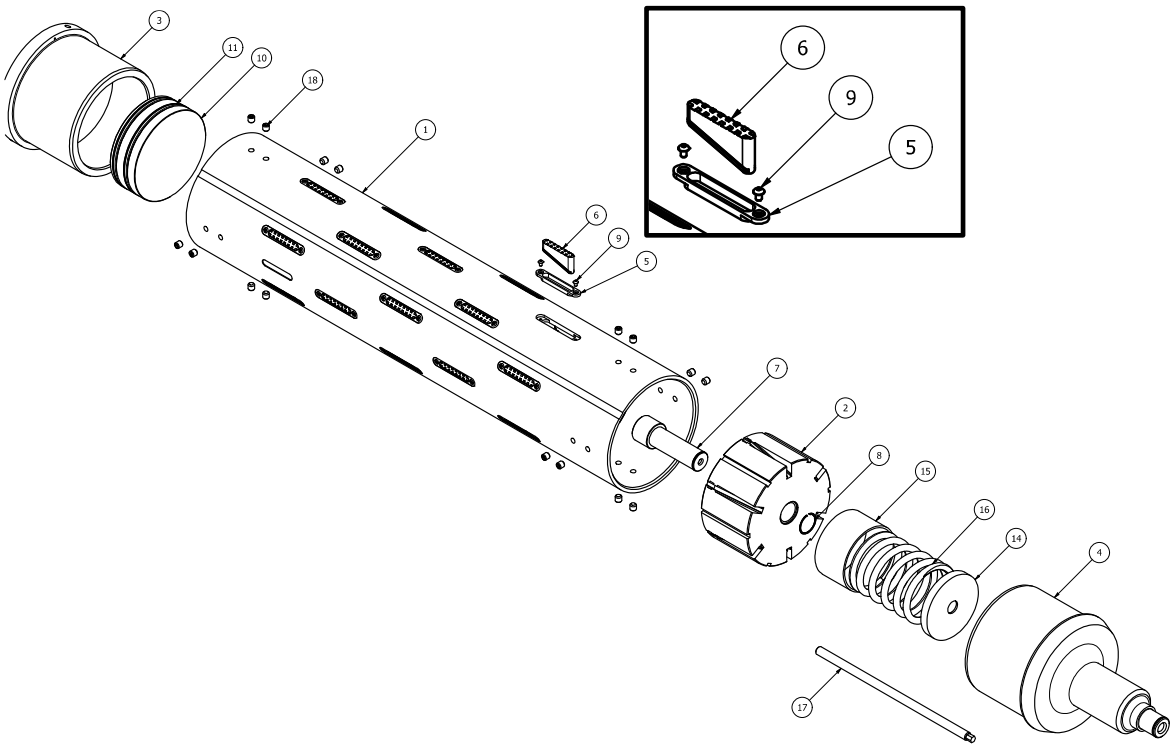
Do NOT use finger to release air

Do NOT deflate while shaft is spinning

- For shafts with manual valves: Using the Tidland Air Release Tool, push in the quick release air valve allowing the air to escape through the hole in the center of the button.

Installation and Operation

Assembly Diagram and Parts List



ITEM	DESCRIPTION
1	BODY TUBE
2	WEDGE BLOCK
3	VALVE JOURNAL
4	NON-VALVE JOURNAL
5	LUG WEAR INSERT
6	LUG
7	WEDGE COMPRESSION ROD
8	SNAP RING
9	BTN HD CPSCR M5 x 0.8 x 8mm
10	PISTON
11	X-RING
12	SPRING STOP
13	FLAT HD CPSCR M10 x 1.5 x 25mm
14	ACETAL SPRING CUP
15	ACETAL SPRING CUP INNER
16	COMPRESSION SPRING
17	MANUAL RETURN ROD
18	SET SCR M12 x 12mm KNURL CUP PT

Figure 1 – Assembly Diagram and Parts List

Installation

Installing Shaft on Machine

Before placing in service, visually inspect shaft for any damage due to shipping or mishandling.

- Keep shaft clean and dry.
- Between every roll change, use compressed air to remove dust and debris buildup.
- **Note: When not in use, always store the shaft fully deflated.**

Track each shaft by recording its serial number and the date it was placed in service.

Installing Core Stops

1. Remove the (2) ½-13 socket head cap screws from the corestop (Refer to Figure 2 below).
2. Install the two sides of the corestop around the shaft and reinstall the cap screws loosely.
3. Move corestop to desired position along the shaft.
4. Make sure to align the reliefs with any lug section the corestop fits over.
5. Tighten the cap screws to 15-17 ft-lbs. of torque and repeat process for next lug section.

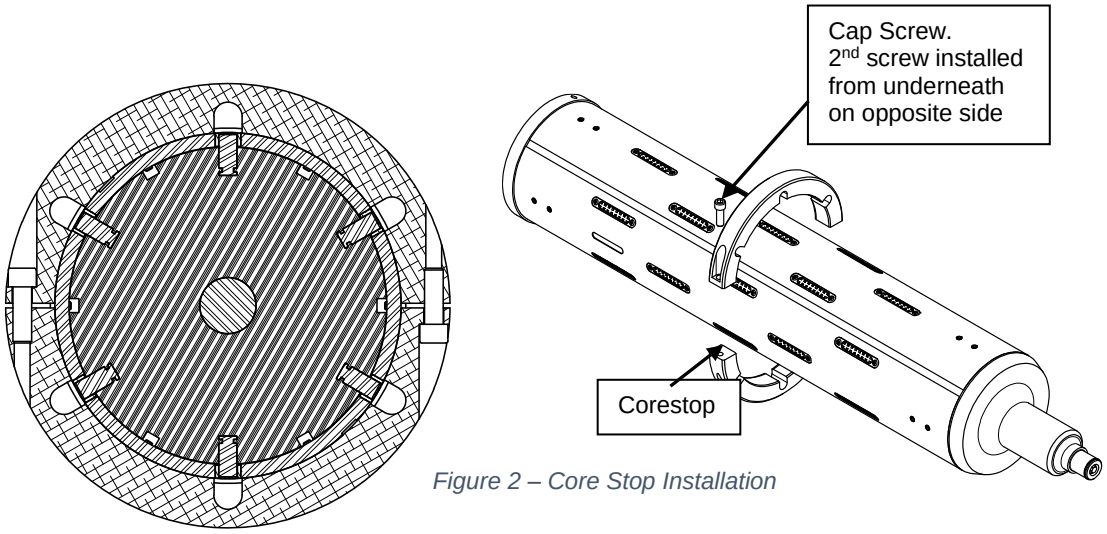


Figure 2 – Core Stop Installation

Mounting Flange Shaft to Spindle

1) Align flange with spindle.
2) Ensure spindle O-ring is installed prior to assembling spindle on to mounting flange.
3) Apply LOCTITE 243 to bolt threads and install as required for your machine.
4) Install core stop according to Steps 1-5 in the previous section.

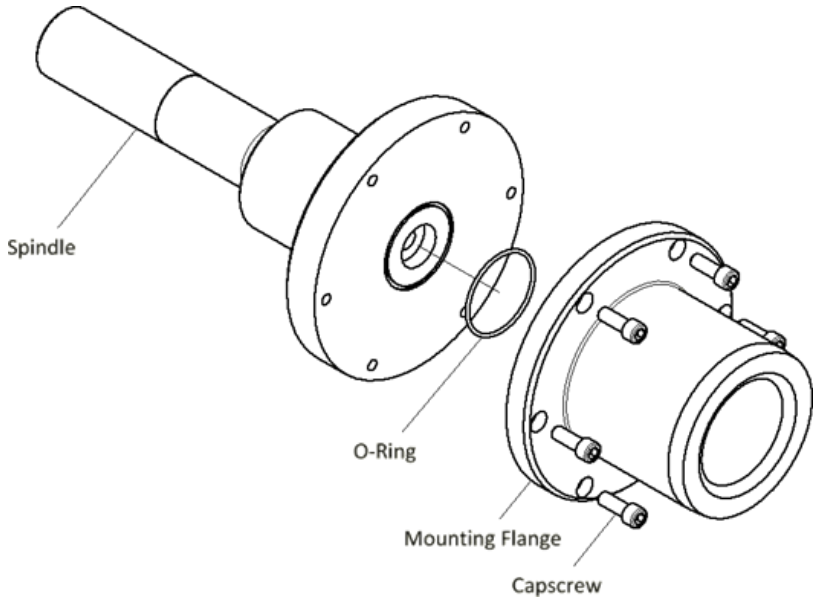


Figure 3 – Flange Shaft Mounting

Bronze Wear Insert Replacement

1. Remove both button head cap screws (Refer to Figure 4).
2. Lift old bronze insert from the cap screw clearance holes.
3. Replace with new bronze insert.
4. Replace button head cap screws and tighten to 40 – 45 in-lbs. (4.5 – 5.0 Nm).

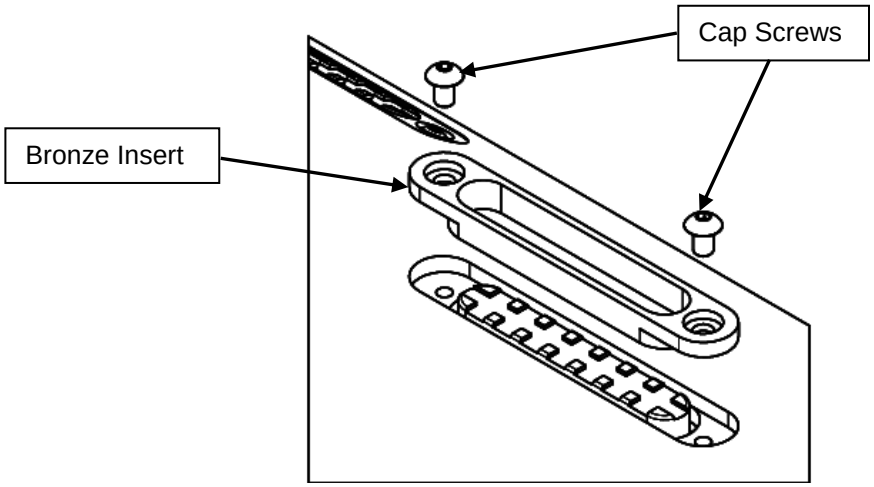


Figure 4 – Bronze Wear Insert

NOTE: Clearance holes for the M5 button head cap screws are tapped with ¼-28 jacking threads.

Manual Retraction Rod

The non-valve journal has an opening to accept a manual retraction rod should the lugs not fully retract upon deflation. The retraction rod is sold separately and must be removed during operation. It can be actuated with a 7/16" deep socket.

Contact your Maxcess representative to order: **Manual Retraction Rod Part #: 270042114**

Journal Removal

1) Deflate shaft. Remove ALL Air!
2) Remove valve.
3) Match mark the valve journal and body before removing the set screws.
4) Remove the set screws.
5) Be mindful that the non-valve journal is under force from a compression spring and will move the journal once the set screws are removed.
6) Using a round clamping fixture to protect the shaft body, lock the shaft in a vise. (Refer to Figure 5)
7) Attach the impact puller/slide-hammer to valve journal end and strike the weight against the stop.

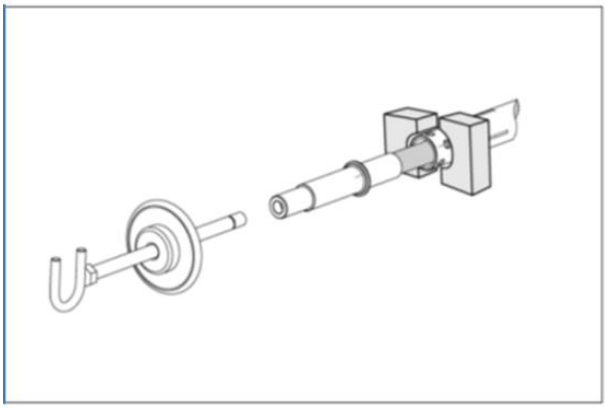


Figure 5 – Journal Removal

Inspection

- Inspect Wedge blocks for wear, dirt, or debris
    - Outside Diameter that slides against body tube Inside Diameter
    - Lug ramps
- Body Inside Diameter
    - Must be clean and smooth
    - Lubricate with a silicone dry lube whenever maintenance is performed
- Piston
    - Bore must be free of contaminants
    - Grease bore with O-ring grease

- O-Rings
    - Inspect for signs of wear
    - Grease with O-ring grease

Valve Replacement

1) Shaft configurations vary. Valve may be installed in the end of the shaft or along its face (Refer to Figure 6).
2) Deflate the shaft. Remove all air. 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).
4) 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.
5) Screw the valve (side or end) into the shaft and torque to 8.8-10 ft-lbs. (12-13.6 Nm).

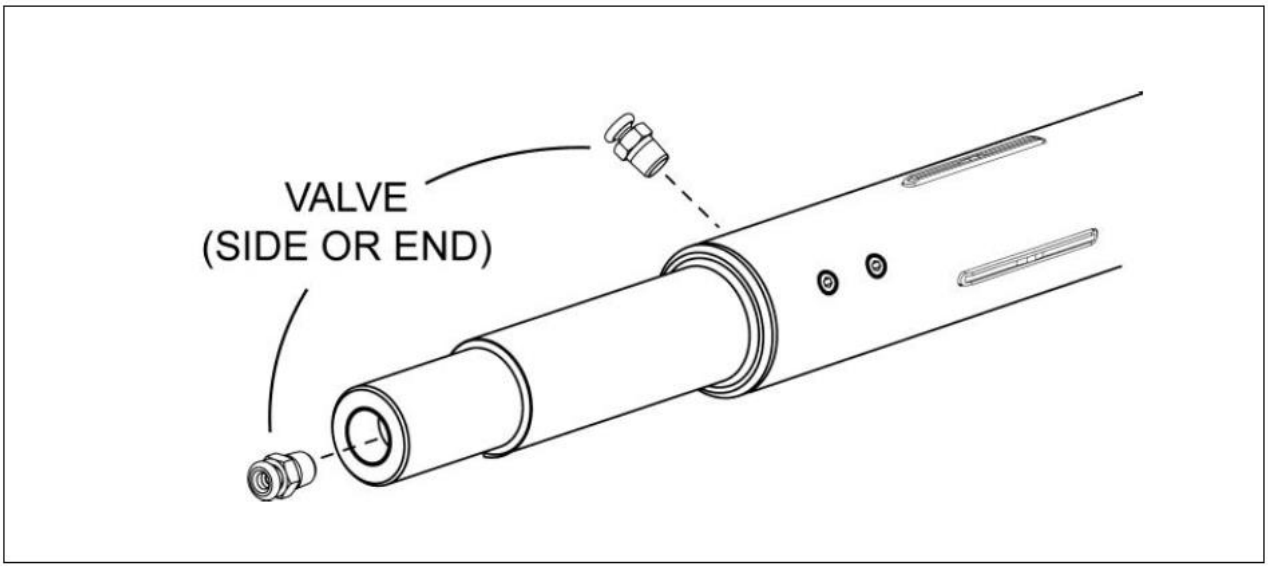
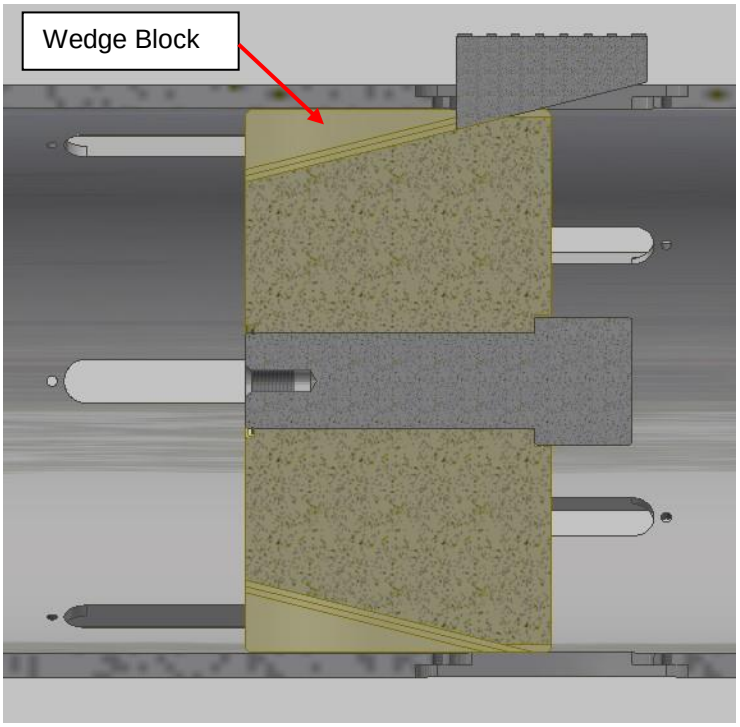


Figure 6 – Valve Replacement

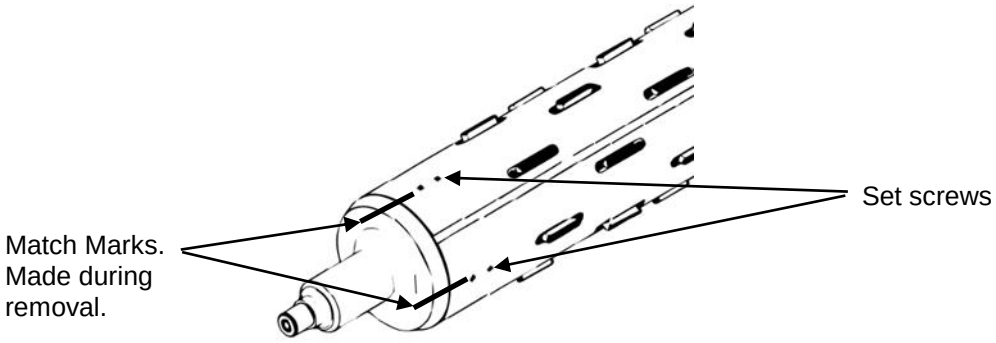
Shaft Assembly Sequence

1) Align a single wedge block into the valve side of the shaft with the ramp sloping down towards the non-valve side of the shaft. The ramp in the wedge block should be aligned with a lug slot in the body.
2) Install first wedge block in the valve end of the body tube. Make sure to install the wedge blocks with the downward slope facing the non-valve end of the body. Slide it far enough so that the rear of the wedge block is halfway in the first lug slot. See image below.



3) The wedge block in this position without the bronze wear inserts installed should allow for the six lugs to be installed radially. Once all lugs have been partially inserted into the wedge ramps, gently push the wedge towards the valve end of the shaft. Make sure to keep pushing the lugs forward until they are sitting flush with the Outside Diameter of the body.
4) Repeat this process for the rest of the wedge blocks and lugs, making sure to install the wedge blocks from the non-valve end of the shaft.
5) Once the lugs are installed, proceed with installing the bronze inserts around all the lugs and securing them to the body with the M5 button head cap screws.

6) Align the match marks on valve journal and shaft and tap the journal into place with a rubber mallet (Refer to Figure 7 below). A clamping device aids in keeping the journal pressed in before the set screws are installed. The journal will be under force from the return spring.
7) When installing the non-valve journal, make sure to keep the spring and plastic spring cup centered inside the bore on the inboard end.
8) Apply small amount of medium-strength thread locker (Loctite 243) to threads of the journal set screws. Reinstall the set screws and torque using the table in Figure 7 below.
9) Apply a thread sealant (Loctite 545 on Tidland valves, or according to valve manufacturer's directions) to threads of the valve (unless the sealant is pre-applied). NOTE: Valves with pre-applied thread sealant are good for up to six (6) uses.
10) Always inspect the valve threads for sufficient sealant; do not reuse more than six (6) times.
11) 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
¼ "	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
½ "	47-52	15-17	M12	62-69	20-23

Figure 7 – Match Marks and Setscrew Torque

Operation

WARNING – Danger of high-speed projectile injury

Do not inflate shaft without journals installed and set screws properly torqued.

Air Pressure

Shaft operation requires 5.5–8.3 bar [80–120 psi].

Inflating Shaft

Shafts may have manual valves, or a port for connection to controlled air supply from the machine.

For manual valves: using the Tidland Inflation Tool, push the air nozzle firmly into the valve receiver, depressing both the valve button and the tip of the inflation.

Do not exceed 8.3 bar [120 psi].

Deflating Shaft

WARNING – Danger of high-pressure injection injury Do not use finger to deflate the shaft.

For manual valves: Using the Tidland Air Release, push in the quick release air valve allowing the air to escape through the hole in the center of the button.

Troubleshooting

Problem	Possible Cause	Recommended Solution
Shaft will not Inflate or Hold Air	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.)
Cores Slipping	Low Air Pressure	Operate shaft at 80 psi minimum (5.5 bar) for optimal performance.
	Air Leak	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 Pre-maturely	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.
Lugs Do Not Fully Retract	Mis-aligned Spring Cup in Non-valve Journal	Remove non-valve journal and align spring
	Debris Causing Binding	Use the manual retraction rod feature to clear debris.

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Service

If you have any questions about one of our products or need to speak with a Customer Service representative, please use the contact information below.

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