



Tidland G690 Leaf Shaft

Operation and Maintenance



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About these operating instructions

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Periodically there will be updates to this manual. The latest version is available at www.maxcessintl.com or by calling your regional office listed on the back page of this publication.

These instructions are designed to help put the external element winding shafts into service and provide important notes for the proper use of the shaft. These instructions are valid for following shaft series:

Series G690C

These instructions are important for the machine manufacturer, end user, machine operator and maintenance personnel. Read and understand these instructions before installing and operating the shaft.

The instructions must be read and used by all persons who have the responsibility of installing and maintaining these shafts.

These instructions must be retained and incorporated in the technical documentation for the machine or partly completed machinery into which the shaft is installed.

The start-up of this winding shaft is forbidden until it is determined that the control, which the operator understands, and the machine into which it has to be assembled, correspond with the regulations of the applicable EC-guidelines.

These are the original instructions, written in English.

Theory of operation

The Tidland G690 is a narrow to medium web width core shaft with an aluminum body and leaves. External bladders activate four expanding leaves that grip the core. The bladders are ultrasonically sealed and secured with screw clamps. Air is delivered to the shaft through a valve located in the end or on the side of the shaft body, or through a rotary union.

Model number key

Shaft series – shaft type – mounting style

Shaft series	G – Global
Shaft type	690 = External element leaf shaft
Mounting type	None = drop-in C = cantilevered

Available models

G690
G690C

Safety Information

When using this Tidland product, always follow basic safety precautions 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; use only the Tidland deflation tool.
- 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.

(continued)

- 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.

Basic safety information

To ensure safe and problem-free installation of the winding shaft, the shaft must be properly transported and stored, professionally installed and placed in operation. Proper operation and maintenance will ensure a long service life of the shaft. Only persons who are acquainted with the installation, commissioning, operation and maintenance of the system and who possess the necessary qualifications for their activities may work on the shaft

Proper use

- The Tidland G690 shaft is intended to be used on unwind or rewind machines.

Improper use

- Operation outside the technical specifications
- Any other use than the proper use shall be deemed inappropriate.

Basic safety information (continued)



Installation and commissioning

WARNING – Danger of falling down or muscle or skeletal injury during installation

The larger design shafts are heavy. Appropriate equipment is to be used and the safety rules of the company must be observed.



Operation

WARNING – Danger of entanglement or pinching during operation

Keep hands and loose clothing away from rotating shaft.



Maintenance and repair

WARNING – Danger of entanglement or pinching
Maintenance and repair tasks on the shaft must be performed only when the machine has been stopped and has been secured from being turned on again.

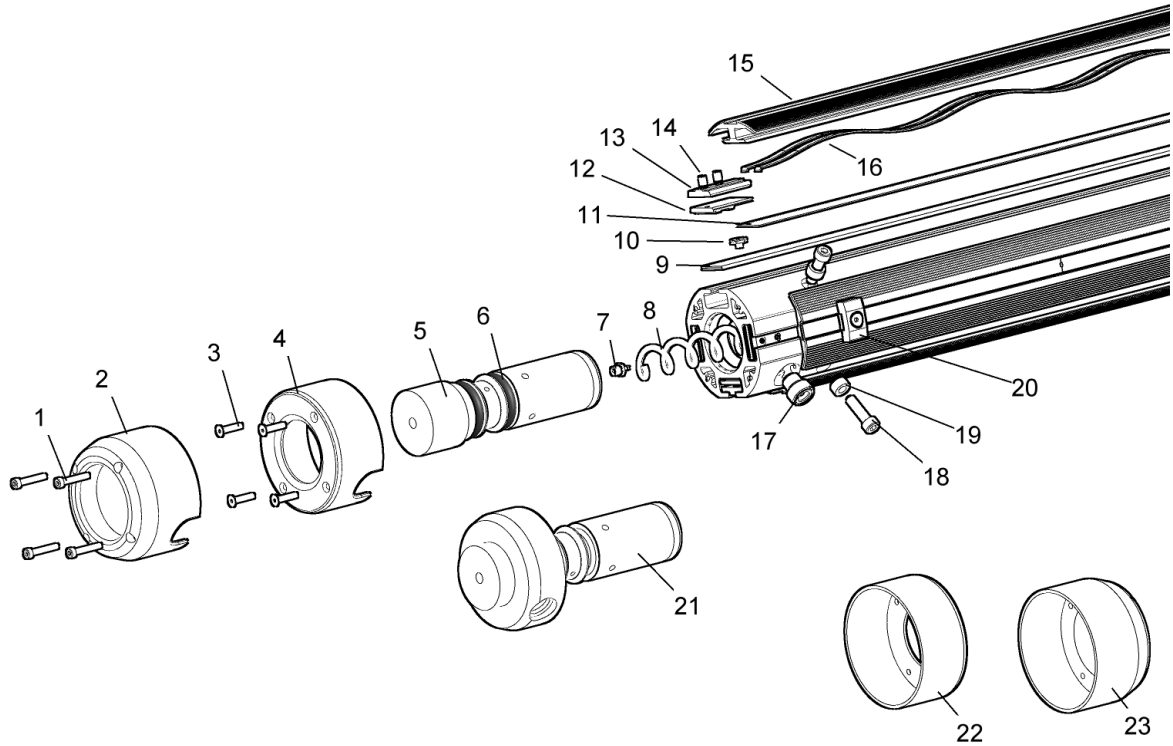
WARNING – Danger of bodily injury or damage to hearing.
Do not inflate bladders without the leaves installed.

Decommissioning

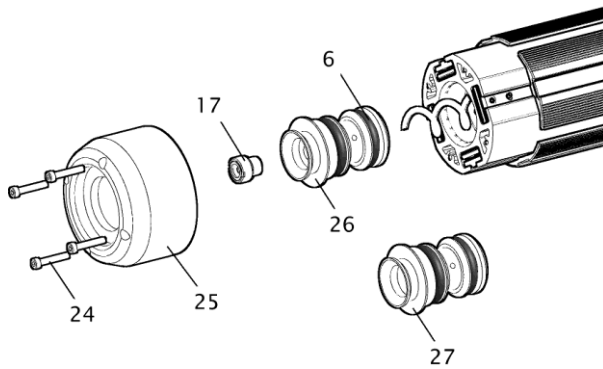
The shaft must be disposed of in accordance with all the applicable national, state and local regulations.

Shaft components

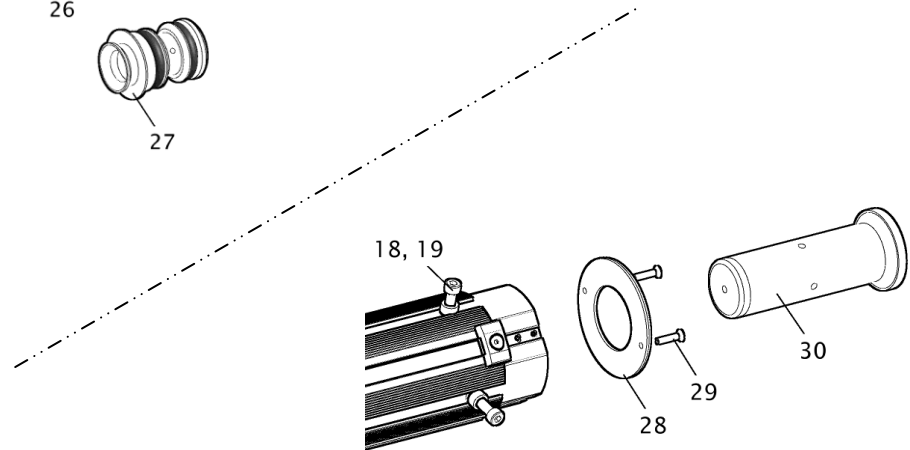
Drop-in



Cantilever



Free end



Fixed end

Parts List

a/r = as required

* Recommended spare parts

Item	Description	Qty	Part No. (N. Amer.)	Part No. (Europe)
1	Soc hd cpscr	4	752636	M259472
2	Nose cone	1	742523	M366382
	OBSOLETE			
3	Flat hd cpscr M3 x 16 mm	4	250039	n/a
4	End cover for side valve (drop-in) †	1	759417	M369270
5	Journal	1	Custom	Custom
* 6	O-ring, Parker	2	746599	M369268
* 7	Air fitting barb (supplied with gasket)	2	748908	M371134
* 8	Coiled air hose	a/r	748907	M371133
* 9	Bladder	a/r	739338	M193425
* 10	Air fitting	4	739339	M250318
* 11	Protection strip	a/r	739340	M245285
* 12	End clamp, bottom	8	740602	M237218
* 13	End clamp, top	8	741758	M365794
14	Set screw, end clamp M4 x 6 mm	16	739345	M141619
15	Leaf	a/r	740912	M740912
* 16	Wave spring	a/r	617952	M322356
* 17	Valve, G1/8 (supplied with gasket)***	1	739343	M266978
18	Soc hd cpscr M5 x 20 mm, Class 8.8, zinc plated	4	544155	n/a
19	Bushing (4 per journal)	a/r	746694	M269271
20	Core stop, optional	1	564239	M367400
21	Journal with shoulder	a/r	Custom	Custom
22	End cover (drop-in) ††	1	759416	M369269
23	Nose cone	1	743718	M365790
	OBSOLETE:			
24	Soc hd cpscr M3 x 20 mm, Class 8.8, zinc plated	4	752636	M259472
25	Nose cone (cantilever)	1	741797	M365790
26	Plug, OBSOLETE ****	1	747517	M370040
27	Air transfer plug	1	747516	M370038
28	Body cover, inboard	1	741775	M365789
29	Flat hd cpscr M3 x 16 mm	2	250039	n/a
	Optional			
	Calibration tape	1	Custom	Custom

*** Valve gasket is available separately (745181) (M284758)

**** Obsolete March 2013: replace with item 27. If not using end valve, also order plug 128045 (M186986).

† On shaft serial numbers prior to 761476, part number was 746301.

†† On shaft serial numbers prior to 761476, part number was 746290.

Operation

Air pressure



Use only clean, dry, non-lubricated air.

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

Connect air hose to the air supply. When inflating shafts not equipped with a rotary union, Tidland recommends the use of a Tidland Inflation Tool. See page 5-1.

Preparing the shaft for operation



Do not rotate shaft without a core installed on expansion elements.

1. Position the shaft in the core.
2. Ensure that all expansion elements are covered by cores or rolls.

Inflating the shaft

Use the Tidland Inflation Tool to inflate the shaft. Hold the nozzle in place until the line pressure air gauge indicates 5.5–8.3 bar [80–120 psi].

Deflating the shaft



Use an appropriate tool to release air from the shaft.
Do not use your finger to deflate the shaft.

The Tidland Air Release Tool is available on request.
See page 5-1 for part number.

Recommended tools and supplies

Hex drive wrenches: 2, 2.5, 4 mm

Tidland inflation tools (contact Maxcess for options)

Tidland air release tool (Tidland 111630)

Tidland valve removal tool:

Tidland North America	745083 (wrench)
	749067 (tool bit only)*
Maxcess Europe	M296213 (wrench)
	M373530 (tool bit only)*

Dow Corning Molykote® 55 o-ring grease

Loctite® 222 (or equivalent)

Loctite® 243 (or equivalent)

Hole punch guide (Tidland Part No. 760792)

Hole punch tool (Tidland Part No. 760668)

* This part is a tool bit for use with a torque wrench.

Using Loctite or equivalent thread locker

Always use a thread locker on component threads during reassembly.

Component	Threadlocker
Element end clamp fasteners Air fitting barbs Valves	Loctite® 222
Journal or end cap fasteners	Loctite® 243

Maintenance schedule

Daily

Keep shaft clean and dry.

Remove dust and debris buildup with compressed air.

Periodically

Inspect journals for wear.

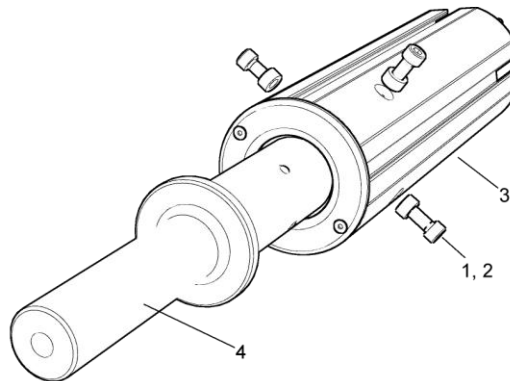
Check for worn or damaged expansion elements.

Removing a journal



To avoid damage to the shaft, Tidland recommends that you remove all of the external elements and bladders, and then secure the shaft in a round clamping fixture before removing the journal.

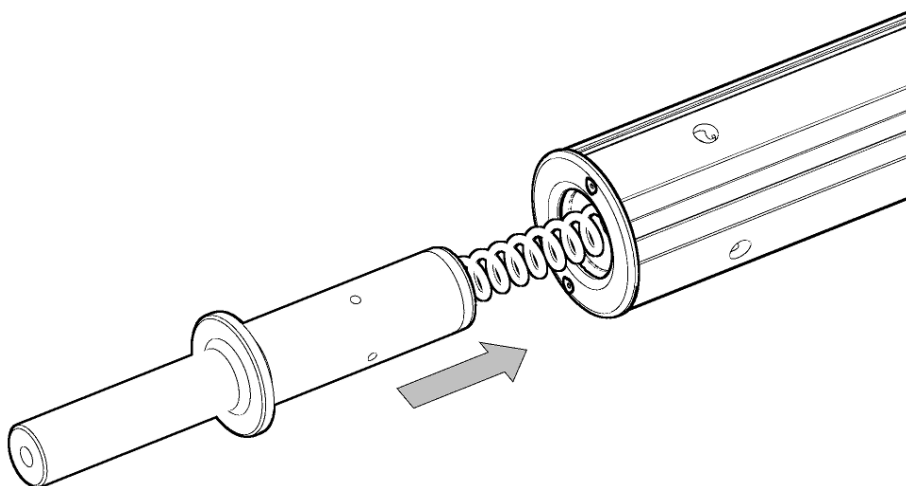
1. **If there is a side valve installed**, remove it from the shaft.
In some cases, you will need to remove the end valve to install a journal removal tool.
2. Remove four M5 socket head cap screws and bushings.
3. Use impact puller to remove the journal.



1	M5 Soc hd cap screw
2	Bushing
3	Shaft body
4	Journal

Reinstalling the journal

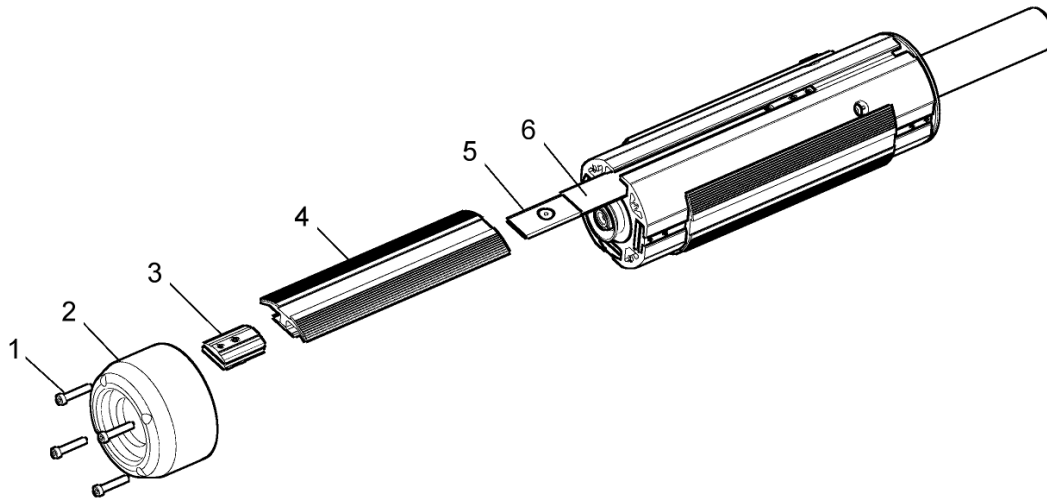
1. Reconnect the hose to the fitting on the journal.
2. Apply o-ring grease to the fit area.
3. Torque the M3 socket head cap screws to 5 Nm [44 in · lbs].
4. Remove the shaft body from the clamping fixture; reinstall the external elements and bladders. See page 5-6.



Air system

Replacing a bladder

1. Remove four M3 screws and end cover.
2. Loosen – do not remove – the M4 set screws in both end clamps.
3. Remove clamps and expansion elements from shaft.



1	M3 Soc hd cap screw
2	End cover / journal feature
3	End clamp assembly
4	Leaf
5	Sealed bladder assembly
6	Protection strip material

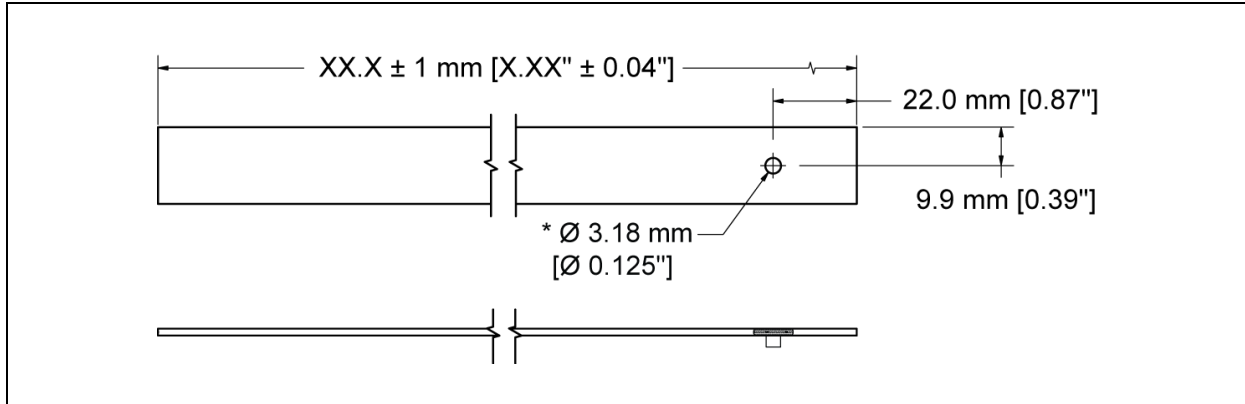
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Cutting the new bladder

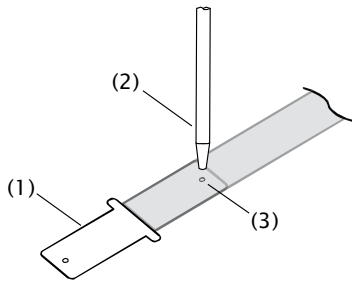
Using bulk bladder material

If you use bulk bladder material instead of the sealed bladder assembly, use the following formula to determine the correct replacement bladder length for your shaft.

$$\text{bladder length} = \text{leaf length} + 60 \text{ mm [2.36"]}$$



* Punch through one wall only



1	Hole locator guide
2	Tidland hole punch
3	Punch mark

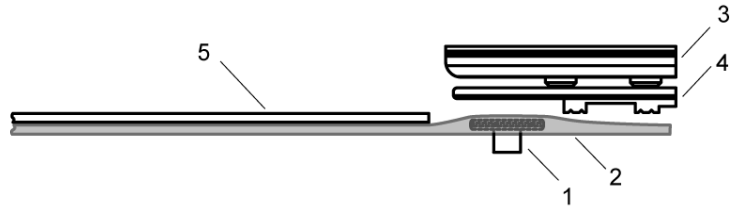
See page 5-1 for part numbers.

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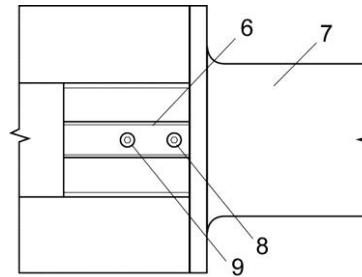
Installing the bladder



Do not use lubricants between the bladder and the protection strip. These components must be clean, dry and free of debris.



1	Air fitting
2	Bladder
3	Top clamp w/ set screws
4	Bottom clamp
5	Protection strip



6	Element end clamp
7	Nosecone / journal feature
8	Outboard set screw
9	Inboard set screw

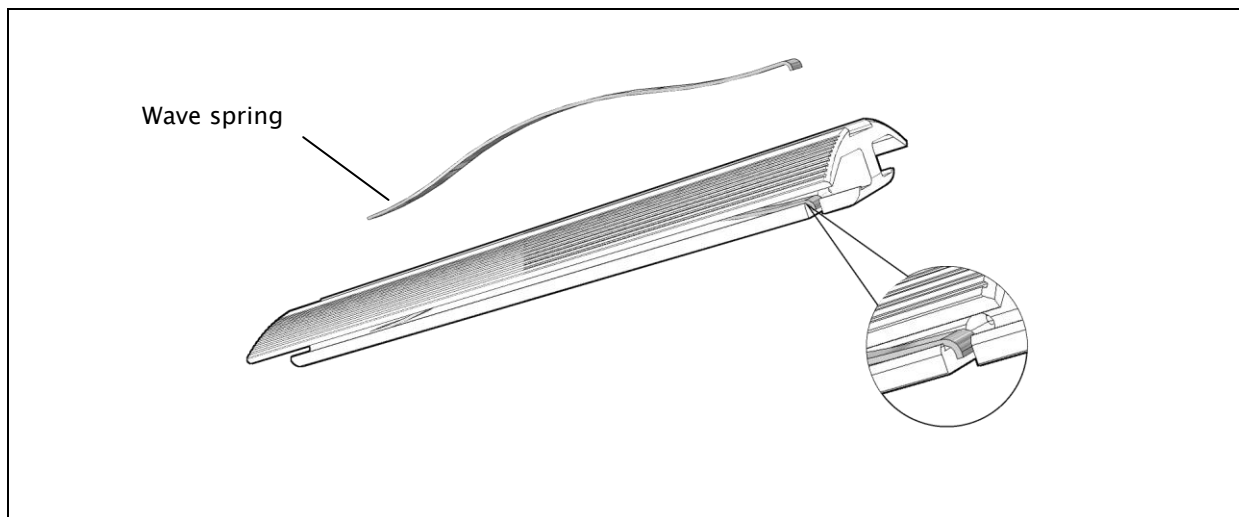
Torque the set screws in the following order:

- a. Outboard: 1 Nm [9 in·lbs]
- b. Inboard: 1.5 Nm [13 in·lbs]
- c. Outboard: 1.5 Nm [13 in·lbs]

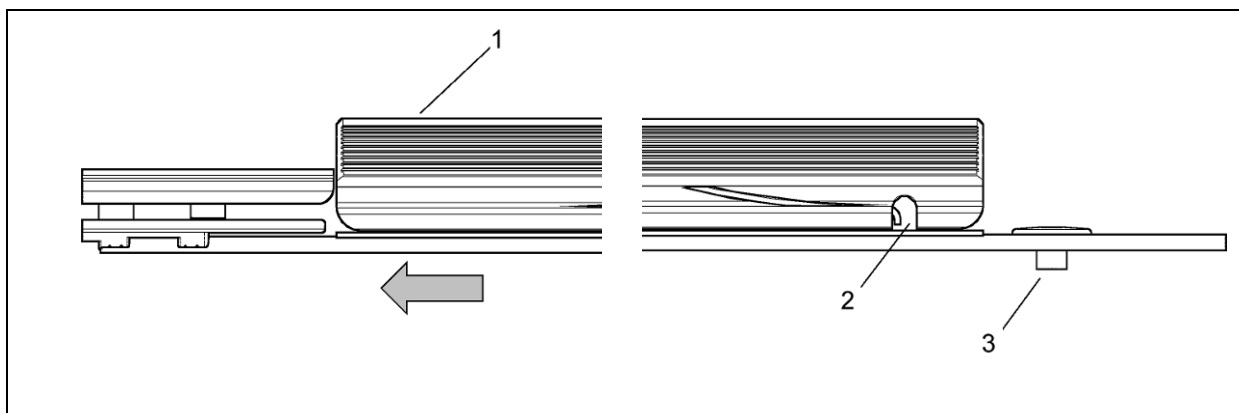
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Reinstalling the leaf assembly

1. Insert wave springs into the leaf. The hook on the wave spring must point down and engage in the notch in the leaf.



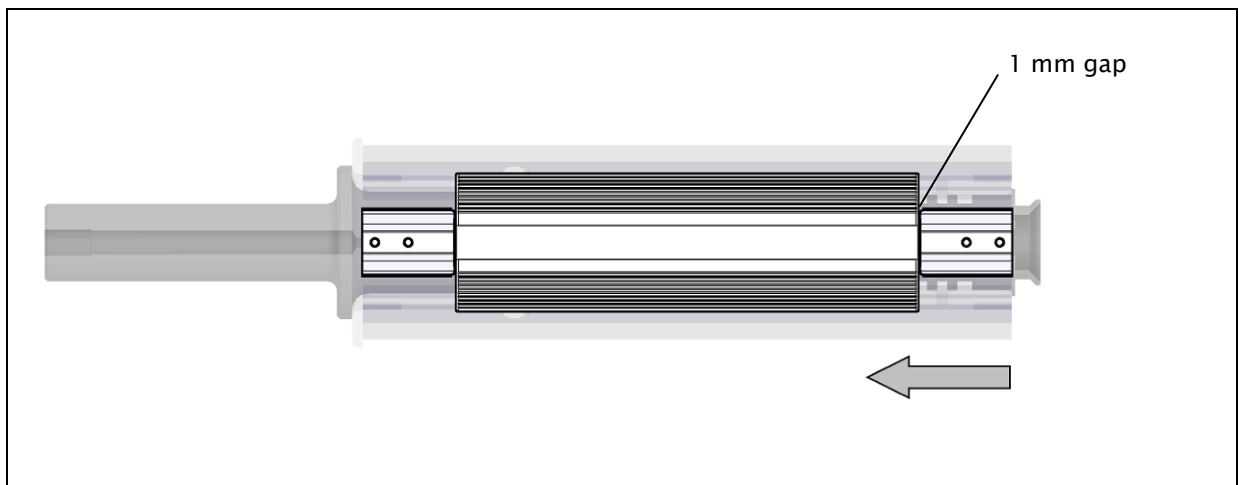
2. Insert the leaf (1) in the direction of the arrow so that when installed, the notched end of the leaf (2) is at the same end as the air fitting (3). Use dry film lubricant spray to ease installation, if needed.



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Reinstalling the remaining end clamp

1. Reinstall the remaining end clamp assembly, maintaining a 1 mm (.04") gap between the clamp and the leaf.
2. Torque the set screws in the following order:
 - 1) Outboard: 1 Nm [9 in · lbs]
 - 2) Inboard: 1.5 Nm [13 in · lbs]
 - 3) Outboard: 1.5 Nm [13 in · lbs]
3. Reinstall the nose cone and torque the screws to 1 Nm [9 in · lbs].



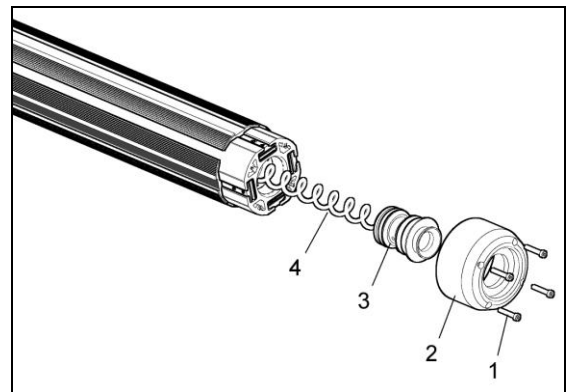
Valve, o-rings, and air hose

Valves

1. Pull the air plug with valve from the shaft body.
2. Use the recommended tool (see page 5-1) to remove the valve from the air plug.
3. If not already pre-applied, apply Loctite 222 to the new valve threads and install with gasket.

Note: If you are reinstalling your existing valve, inspect the gasket and replace if damaged or worn.

1	M3 Soc hd cap screw
2	Nosecone / journal
3	Air plug w/ valve and o-rings
4	Coiled air hose



O-rings

Inspect the o-rings and replace if damaged or worn. Lubricate with o-ring grease.

Inspect the fit surfaces of the journal and bore for galling, which can cause leaks.

Air hose

If you are using bulk air hose material, use the following formula to measure and cut hose to length for your shaft:

$$\text{coiled air hose length} = \text{leaf length} \times .102$$

Problem	Possible Cause	Recommended Solution
Cores slipping	Low air pressure	Operate shaft at 5.5 bar [80 psi] minimum for optimal performance. Check for leaks.
	Wrong core diameter	Shaft is designed to support core diameter of $76.2 \pm .76$ mm [$3.00" \pm .03"$]
	External leaves worn	Inspect leaves for smooth spots and replace as necessary.
	Web tension out of spec	Check your winding process.
Shaft will not inflate or hold air	Bladder leak	Listen for leaks to determine which element is leaking; replace the bladder.
	Valve is leaking	Use soapy water to test the valve for leaks. Replace valve if necessary.
	Bad o-rings in air plug	Remove nose cone and air plug to inspect o-rings. Replace if damaged or worn.
	Internal air hose is leaking or kinked	Disassemble shaft and check the air hose. Replace if necessary.
Journals wear prematurely	High loads or speeds	Check PSDS specifications for your shaft application.
	Incorrect shaft mounting	Check shaft at installation mounting points.
Excessive shaft vibration	Shaft imbalance	Contact Maxcess.
		1.360.834.2345
		1.800.426.1000

Specifications



WARNING – Do not use the devices outside of their rated specifications.

Refer to your Product Safety Data Sheet (PSDS) for your custom shaft specifications.

Operating air pressure	5.5–8.3 bar [80–120 psi]
Ambient operating temperature	38° C [100° F]
Core diameter	76.2 ± .76 mm [3.00" ± .03"]
Core types	Fiber or plastic

Service requests and replacement parts

To request service or to get replacement parts, contact Maxcess or one of the locations listed on the back page of this publication.

Maxcess
2305 SE 8th Avenue
Camas WA 98607
1.360.834.2345
1.800.426.1000

Please have your shaft serial number available when you call.



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