

ROTARY WATERBLAST TOOL

CST-AIR-P12

Cable Swivel Tool

**Operation and Maintenance
Manual**



WATERJET ENGINEERING
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1.0 INTRODUCTION

This manual was prepared to provide the operator with the basic information needed to operate and service this equipment. The operating recommendations in the manual will insure that you receive satisfactory performance. All operating personnel responsible for the care of this equipment should be familiar with the information in this manual.

If you have any questions or problems with this equipment, please contact the distributor you obtained the product from, or the manufacturer:

StoneAge, Inc.
54 Girard St.
Durango, CO 81301
(970) 259-2869
fax (970) 259-2868

2.0 SAFETY WARNING

Operations with this tool can be potentially dangerous if caution is not exercised prior to and during tool use. Please read and follow all of these instructions.

- 2.1** Only competent and trained persons should operate this equipment.
- 2.2** Do not exceed the maximum operating pressure specified for any component in a system.
- 2.3** This equipment should always be used with an operator controlled dump mechanism to release the high pressure water.
- 2.4** The immediate work area should be marked off to keep out untrained persons.
- 2.5** All personnel in the area should wear eye protection, and other protective clothing in accordance with specific conditions.
- 2.6** The tool should be securely supported. Strong thrust is created by waterjets and these forces can become unbalanced if a nozzle should become plugged.
- 2.7** Inspect the equipment for visible signs of deterioration, damage, or improper assembly. Do not operate until repaired. Make sure all threaded connections are tight and leak free.
- 2.8** Check to see that all control functions work properly before going to high pressure.
- 2.9** If it is necessary to have a person work near the cleaning jets, then it is this person who should have control of the pressure dump mechanism.

3.0 DESCRIPTION

The **Cable Swivel Tool** is an air powered swivel designed for large vessel and boiler cleaning. The powerful rotating jets cover a large area for efficient cleaning. An air motor and gearbox rotate the head of the tool.

The CST has a hole through the center, through which a cable is passed. Up to 3/8"Ø cable may be used. The cable is strung across the vessel, and the CST is pulled along the cable by jet reaction force or by another cable attached to the pulling eye or high pressure hoses. The tool can be used at operating pressures up to 10000 psi and flow rates up to 150 gpm. It has two 1" NPT female inlets in the body. One of these ports may be plugged. The tool has a flow rating of Cv=5.3. At 150 gpm, the pressure drop through the tool will be 800 psi.

The standard nozzle head has six 3/4 NPT female ports; two opposite at 90°, two opposite at 80°, and one at 70° matched with one at 110°. Two or more may be plugged; always **use balanced combinations of ports**.

The CST should be greased at the three zerks every 40 hours to protect the bearings. The bearings are factory sealed, and should be replaced when they lock up.

Always check the pulling eye for free rotation before use, otherwise the pulling cable will get wrapped around the support cable.

The air motor lubricator should be refilled every 12 hours.

When ready to begin using the tool, start the rotation before going up in pressure.

We recommend hanging the high pressure hoses from slings at intervals along the cable.

4.0 PARTS LIST

CST-AIR-P12 CABLE SWIVEL TOOL

Swivel Assembly

<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY</u>
CST 001	Shaft	1
CST 006	Threaded Collar	1
CST 007	Sleeve, Bearing	2
CST 011	Carbide Seat	2
CST 012	H.P. Seal	2
CST 024	Set Screw	6
CST 027	Bent Pipe Inlet	2
CST 030	O-ring	4
CST 031	Back Up Ring	4
CST 033	Shaft Seal	4
CST 040-P12	Head	1
CST 045	Cap Screw	4
CST 104	Body	1
CST 105	Face Ring	2
CST 109	Bearing	2
CST 118	Torque Bolt	1
CST 123	Spacer, Head end	1
CST 125	Spacer, Tail end	1
CST 129	O-ring	2
CST 176	Locking Collar	1
FS 004-0°	Zerk	2

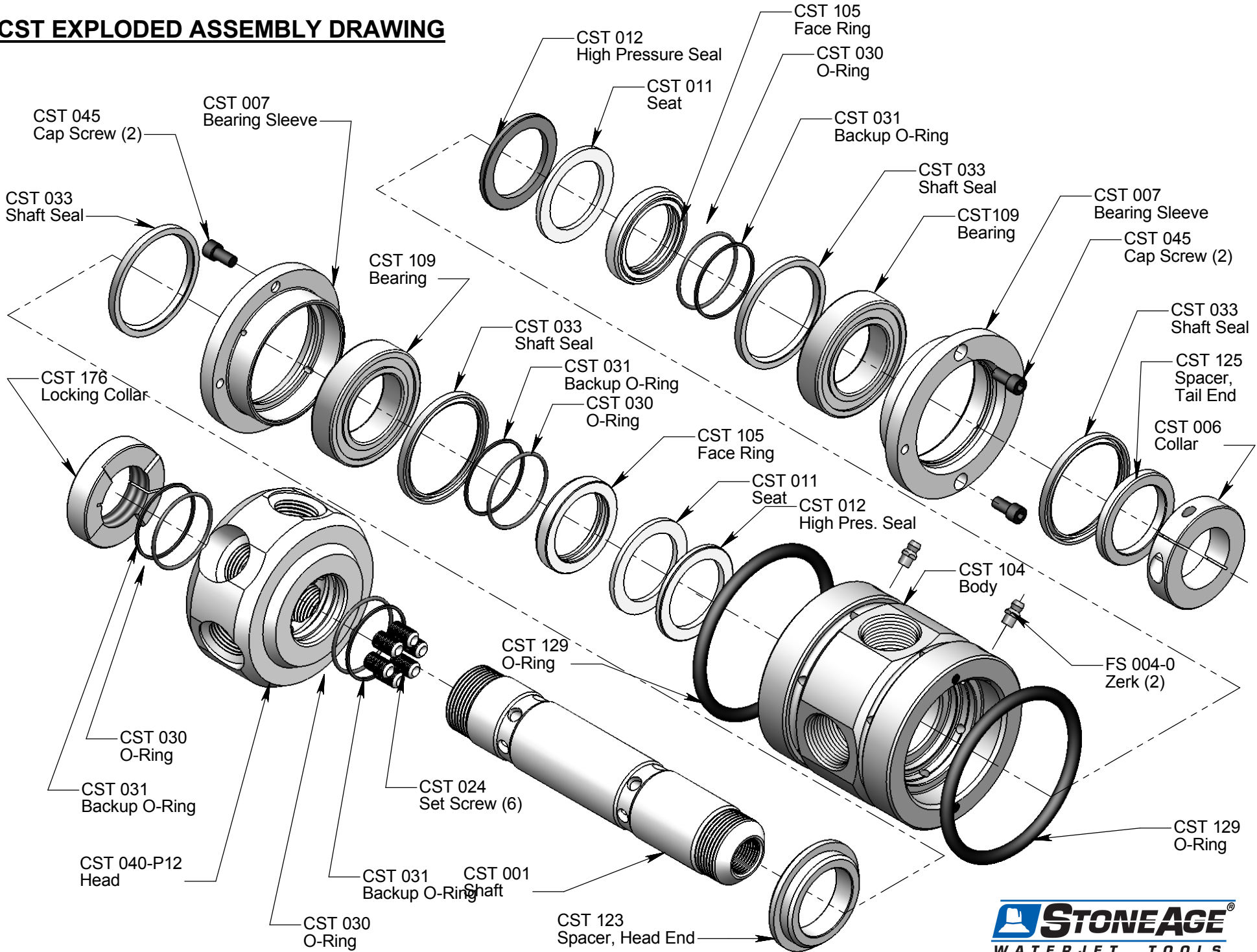
Air Drive Assembly-CST 100

CST 022	Stub Shaft	1
CST 120	Torque Arm	1
CST 130	Hose	1
CST 151	Gearbox, Cobra	1
BR 155	Muffler	1
CB 114	Inlet Fitting	1
GP 057	Oiler	1
LM 016-4	Air Motor	1

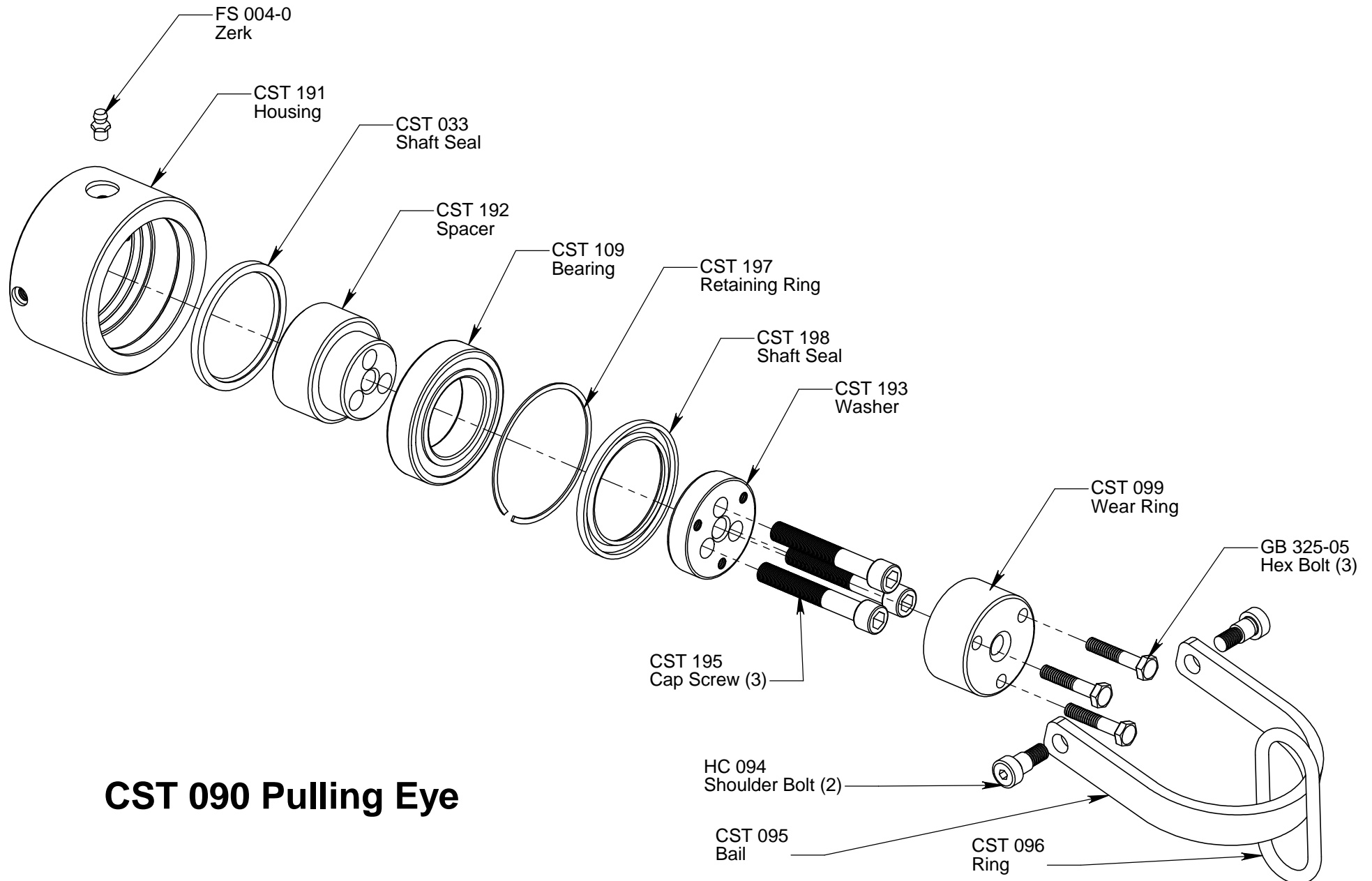
Pulling Eye Assembly-CST 090

CST 033	Shaft Seal	1
CST 095	Bail	1
CST 096	Ring	1
CST 099	Wear Ring	1
CST 109	Bearing	1
CST 191	Housing	1
CST 192	Spacer	1
CST 193	Washer	1
CST 195	Pulling Eye Bolt	3
CST 197	Retaining Ring	1
CST 198	Shaft Seal	1
FS 004-0°	Zerk	1
GB 325-05	Hex Bolt	3
HC 094	Shoulder Bolt	2

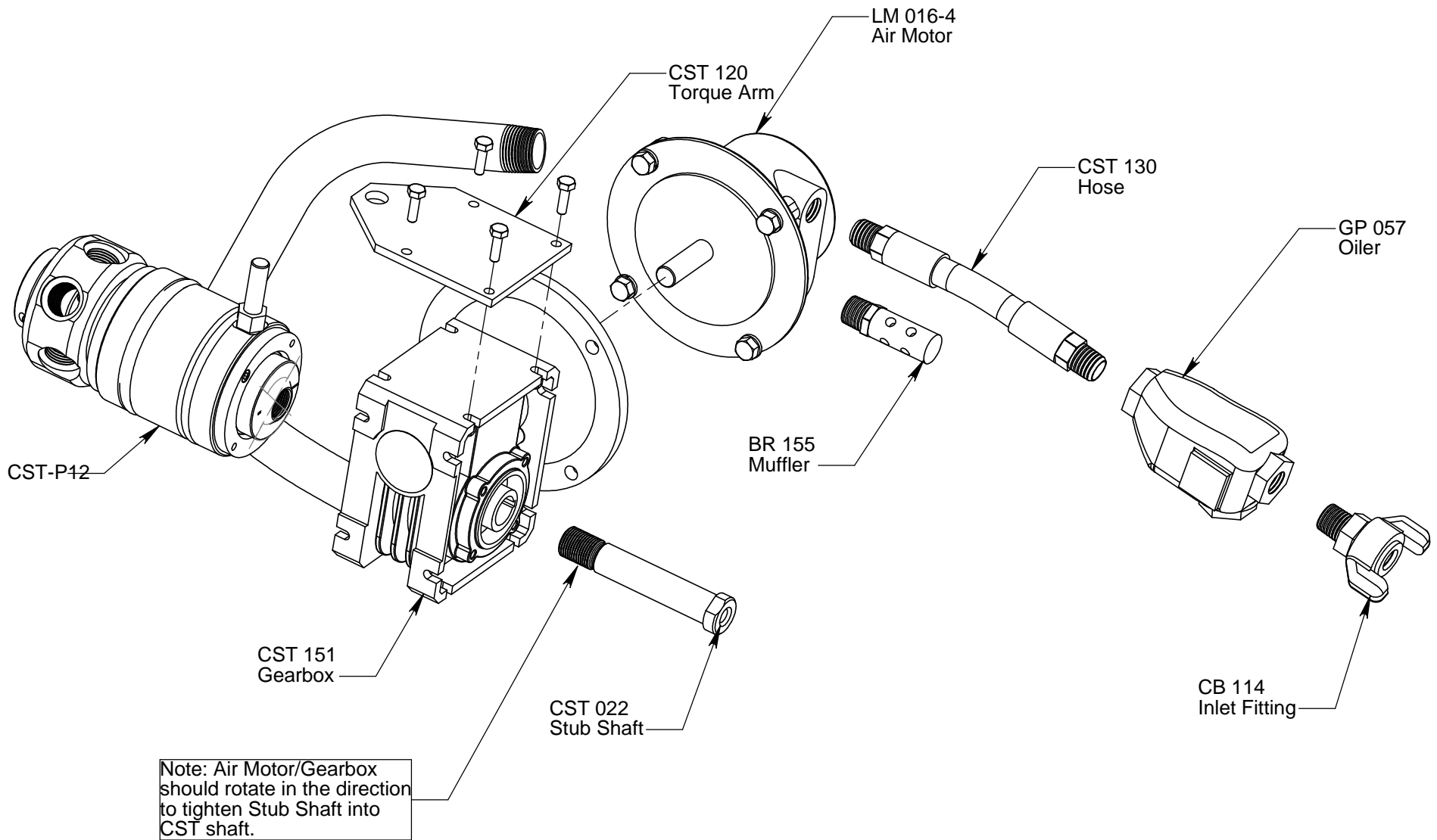
CST EXPLODED ASSEMBLY DRAWING



5.2 PULLING EYE EXPLODED ASSEMBLY



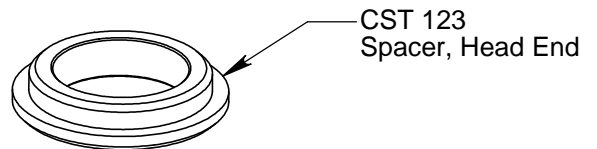
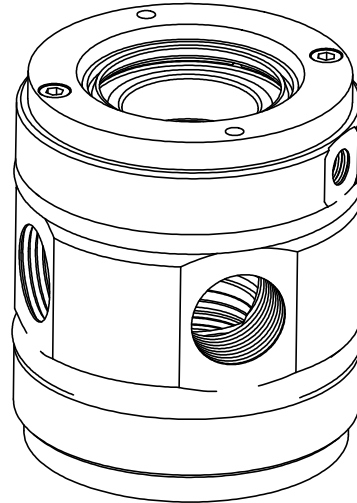
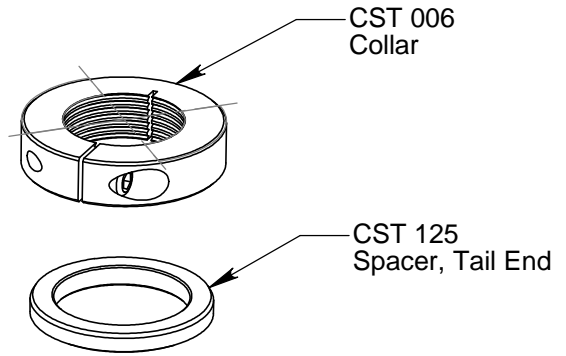
5.3 Air Drive Assembly CST 100 Assembly



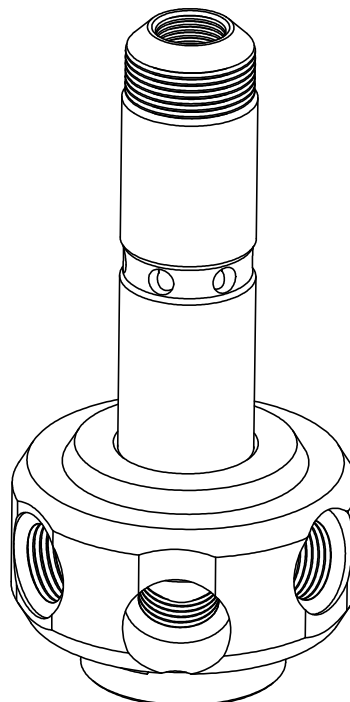
6.0 DISASSEMBLY INSTRUCTIONS

1) Loosen clamp screw on Collar (CST 006) that is on the end opposite the head; unscrew Collar from Shaft end.

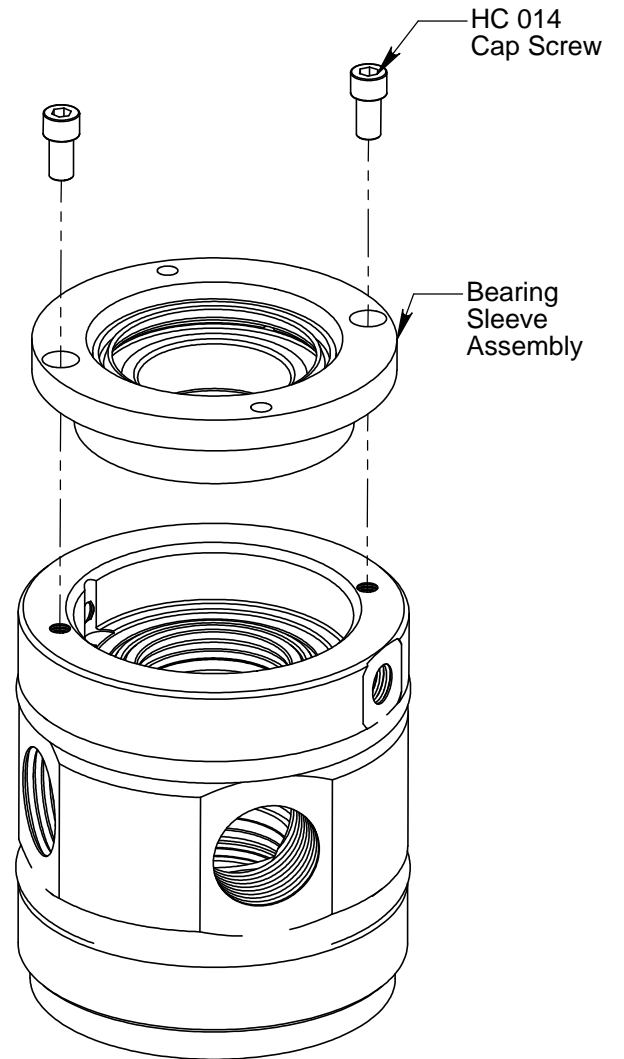
2) Clamp the head in a vise and pull the Body off the Shaft or push the shaft thru the body.



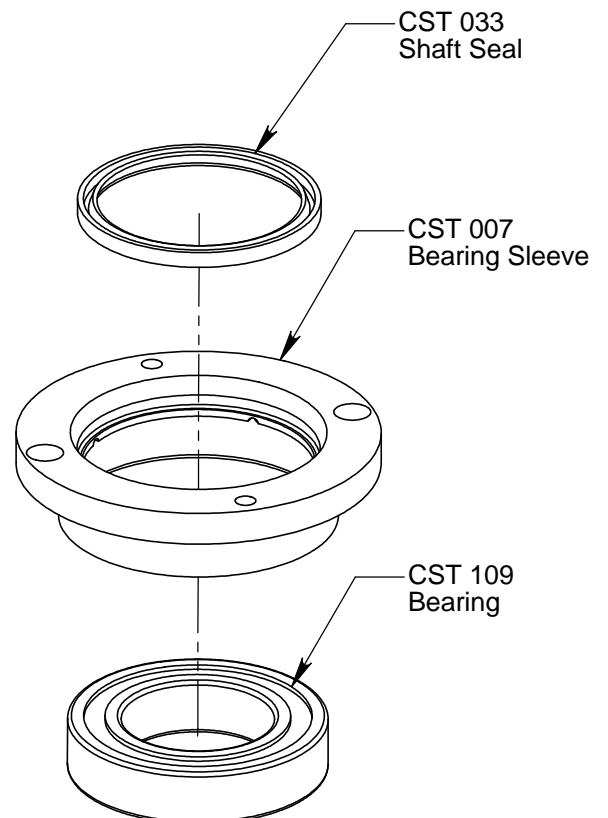
To remove the head from the shaft, remove the Collar (CST 176) near the head; push the shaft out of the head. Inspect the O-Rings and Backup rings in the head for cuts or extrusions. Replace if damaged.



3) Remove Cap Screws (CST 045); pry the bearing sleeve assembly out of the body, using two screwdrivers inserted in the slots. Keep assembly as straight as possible in bore as it comes out.



4) Inspect Shaft Seal (CST 033) for cuts or damage: remove it only if it needs to be replaced.



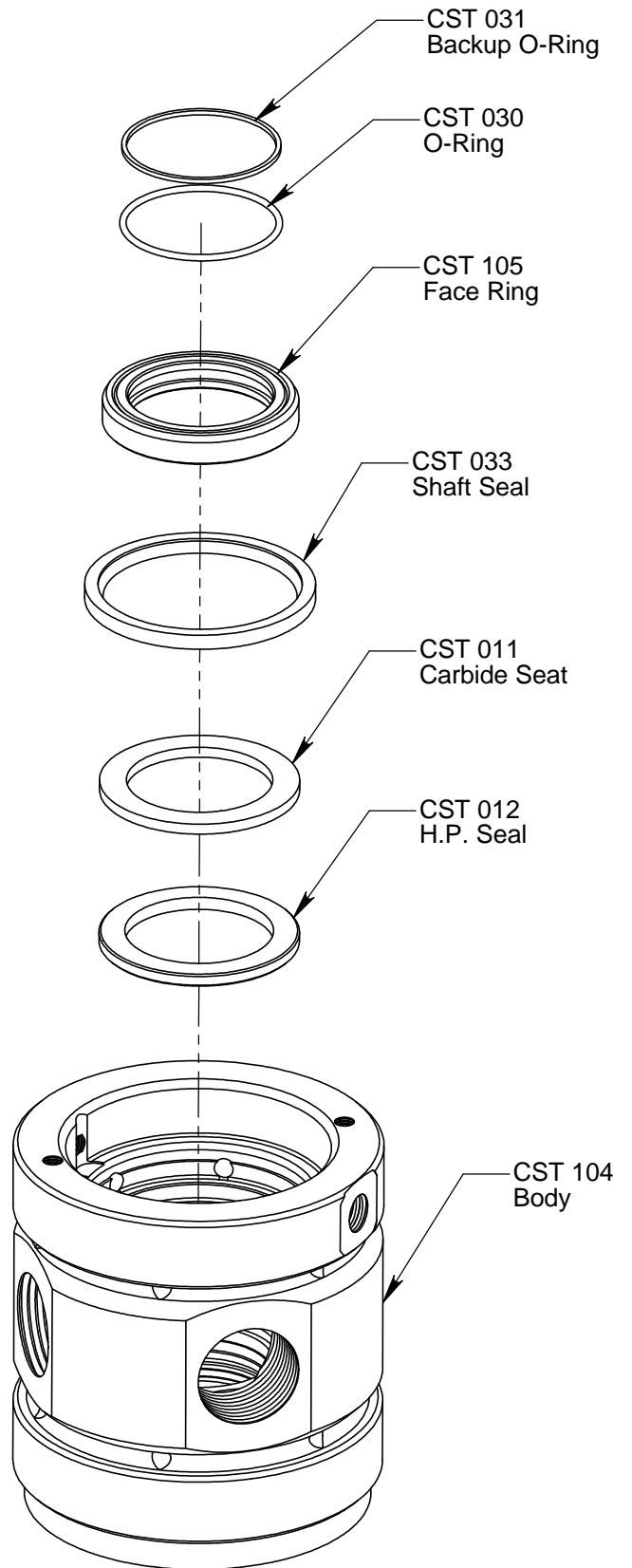
5) Inspect bearing (CST 109); it should rotate smoothly. If it needs to be replaced, press it out of the bearing sleeve (CST 007).

6) Pull the Face ring (CST 105) out of the body; inspect the O-Ring and Backup Ring (CST 030, 031) for cuts or extrusions and replace if damaged.

7) Carefully remove the Carbide Seat (CST 011) and High Pressure Seal (CST 012) to avoid damage to the Shaft Seal (CST 033). Inspect the shaft seal for cuts or damage to the rubber lip. Remove and replace the Shaft Seal (CST 033) only if it is damaged. It is difficult to remove, and is pried out with a screwdriver.

Inspect the Carbide Seat for chips, cracks or erosion. Replace if damaged.

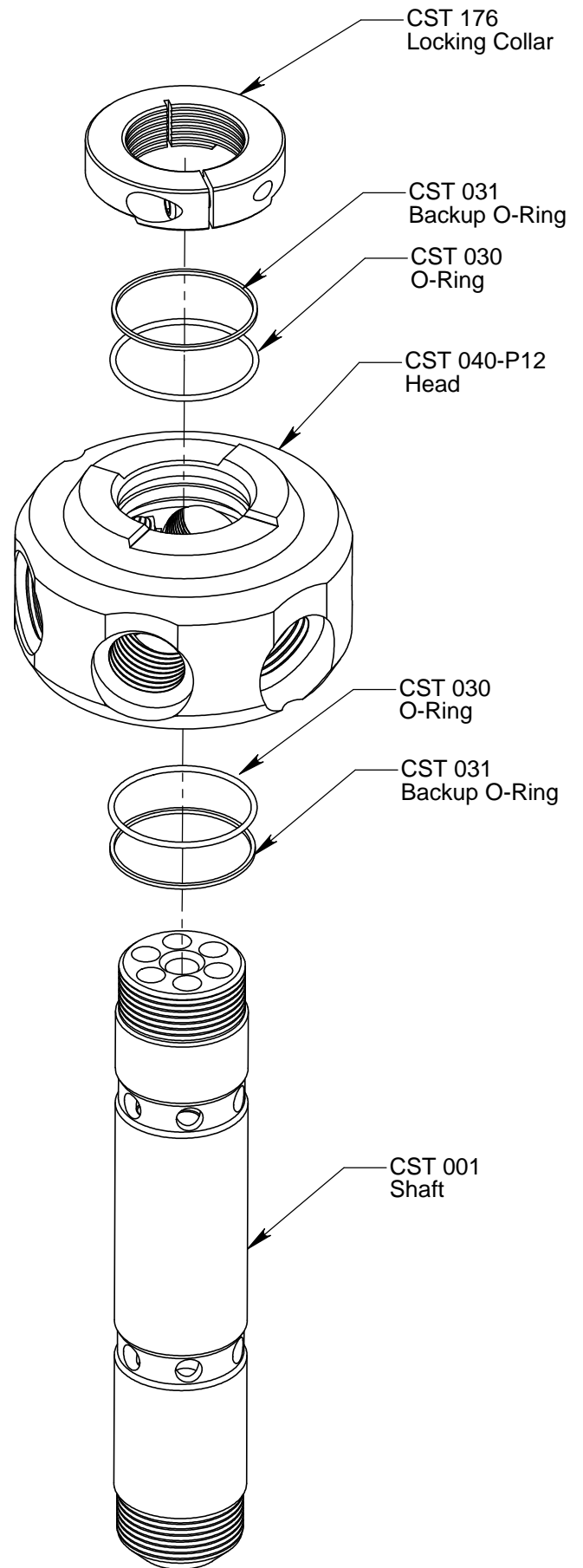
8) Turn Body over and repeat Steps 3 to 7 for the other end.



6.1 ASSEMBLY INSTRUCTIONS

1) Install O-Rings and Backup Rings (CST 030, 031) in grooves in Head (CST 040). Note orientation of the O-Rings and Backup Rings; it is important that they are installed in this orientation.

2) Apply grease to O-Rings and Backup Rings in Head. Slide Head (CST 040, with O-Rings and Backup Rings installed) carefully onto the shaft (CST 001) until threads on shaft end are exposed. Thread Collar (CST 176) onto the shaft until flush with end of shaft. Tighten clamp screw on Collar to lock in place.

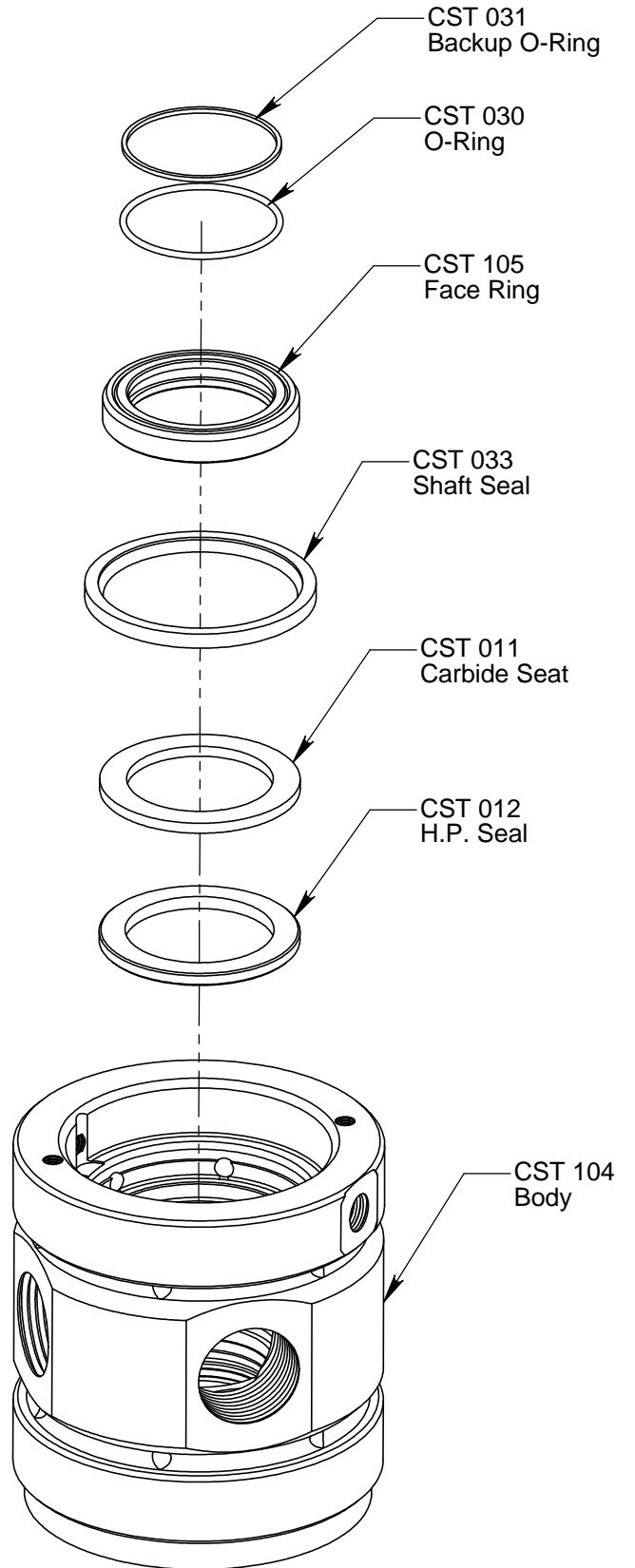


3) Apply grease to the faces of the High Pressure Seal (CST 012). Install High Pressure Seal and Carbide Seat (CST 011) into Body (CST 104). The Seal should fit tight into bore. If the Shaft Seal (CST 033) is still in place, the H.P Seal and seat must be pushed thru the shaft seal.

4) Install new SHaft Seal (CST 033) into Body if old one was removed. The lip of the shaft seal should face down, toward the Carbide Seat.

5) Note that Face Ring (CST 105) has a face with a larger chamfer on the edge. The opposite face goes down against the Carbide Seat. Install O-ring (CST 030) and Backup ring (CST 031) into Face Ring (CST 105). Note order of O-Ring and Backup ring; it is important that they are installed as shown. Apply grease to O-Ring and Backup Ring.

Push Face Ring thru shaft seal against top of Carbide Seat. The top of the Face Ring should be close to flush with bearing bore step in Body.

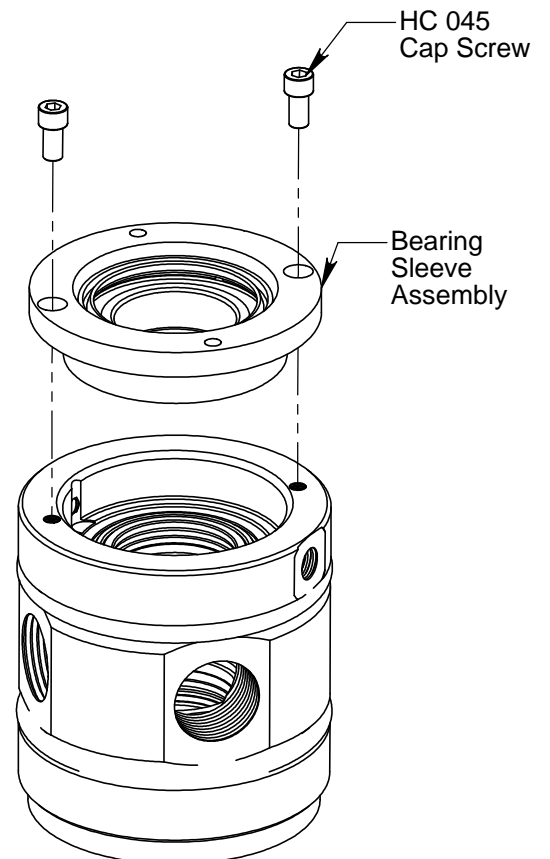
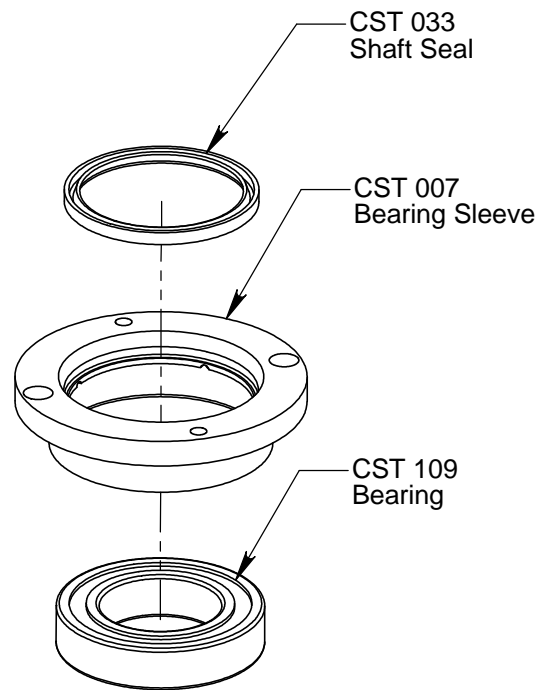


6) Install Shaft Seal (CST 033) into Bearing Sleeve (CST 007). The lip of the shaft seal should face away from the bearing bore.

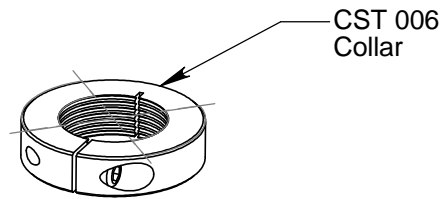
7) Install Bearing (CST 109) into Bearing Sleeve (CST 007).

8) Install Bearing Sleeve Assembly (From Step 7) into Body, aligning holes in Sleeve with tapped holes in Body. Install two Cap Screws (CST 045)

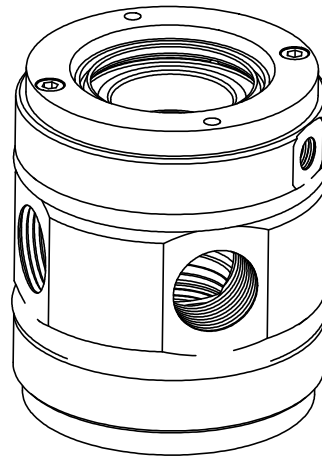
9) Turn Body over and repeat Steps 3-8 for the other end.



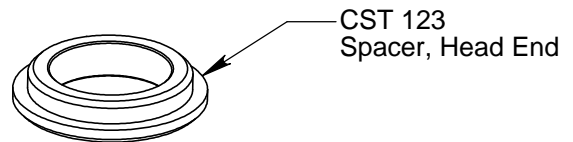
10) Slide Head End Spacer (CST 123) onto Shaft, down against Head. The Large Diameter end of the spacer should go against head.



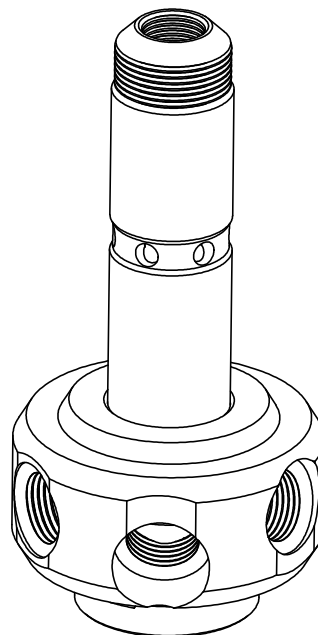
11) Carefully push Body Assembly down onto Shaft until inner race of bottom bearing is against the Spacer.



12) Slide the tail End Spacer (CST 125) onto Shaft end and down against the bearing.



13) Thread Collar (CST 006) onto end of shaft. Tighten this collar snugly against the spacer to remove end play of the shaft. Do not load bearings by overtightening Collar. The face of the collar should be about flush with the end clamp screw on Collar to lock in place. Check that the Head and Shaft can be rotated by hand.



14) Grease the swivel at the Two Zerks in the body.

6.3 TROUBLESHOOTING GUIDE

SYMPTOM	PROBLEM	SOLUTION
Leaks out weeps in body	<ol style="list-style-type: none">1. Worn H.P. Seal2. Eroded seat3. Damaged face ring	<ol style="list-style-type: none">1. Replace seal (CST 012)2. Replace seat (CST 011)3. Replace face ring (CST 105)
Seals wear out too quickly	<ol style="list-style-type: none">1. Rotation too fast2. Damaged seat3. Seal bore ID worn	<ol style="list-style-type: none">1. Slow down rotation speed2. Check for chipped edges3. Replace body
Water found in bearings	<ol style="list-style-type: none">1. Operated with H.P. seal leaking badly2. O-rings and backup rings are damaged.3. Shaft seals damaged.	<ol style="list-style-type: none">1. Replace seal (CST 012)2. Replace O-rings and backup rings. (CST 030, CST 031)3. Replace shaft seals (CST 033)
Shaft will not rotate	<ol style="list-style-type: none">1. High seal torque2. Air motor damage3. Bad bearings4. Improper Assembly	<ol style="list-style-type: none">1. Test rotation with no water pressure2. Remove air motor from gearbox and test for operation.3. Replace bearings4. Inspect and repair

7.0 LIMITED WARRANTY

StoneAge, Inc. warrants to the extent herein provided the products of its own manufacture against defects in material and workmanship under normal use and service for which the products were designed for a period of six (6) months after shipment from the factory. If such products should fail through defect in workmanship or material and specific written notice of failure is made within six (6) months after date of shipment from the factory, StoneAge, Inc. will either repair or replace any such items, F.O.B. its factory without charge. StoneAge, Inc. shall not be liable for expense incurred in repairs or alterations made outside the factory without the proper and prior authorization. StoneAge, Inc. shall have the option of requiring the return of the defective products to its factory, with transportation charges prepaid, to establish the claim. StoneAge, Inc. shall in no event be held liable for damages or delay resulting from or arising out of defective products nor for consequential damages or otherwise except for repair or replacement of items of defective material or workmanship asforesaid.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR USE AND NEITHER ASSUMES, NOR AUTHORIZES ANY PERSON TO ASSUME FOR STONEAGE, INC. ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF ITS PRODUCTS. THIS WARRANTY SHALL NOT APPLY TO PRODUCTS OR ANY PARTS THEREOF WHICH HAVE BEEN SUBJECT TO ACCIDENT, NEGLIGENCE, ALTERATION, ABUSE, OR MISUSE. STONEAGE, INC. MAKES NO WARRANTY WHATSOEVER IN RESPECT TO ACCESSORIES, PARTS OR PRODUCTS NOT MANUFACTURED BY STONEAGE, INC.

WARNING: Any modification of this equipment, or use of non-StoneAge specified replacement parts, will void the manufacturer warranty and could potentially cause harm to the operator or damage to the equipment.

AM SERIES LUBRICATED AIR MOTORS

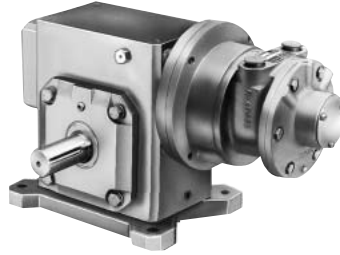
OPERATION & MAINTENANCE MANUAL



Model 2AM Shown



Model 4AM Shown



Model 6AM Shown



Model 16AM Shown

Thank you for purchasing this Gast product. It is manufactured to the highest standards using quality materials. Please follow all recommended maintenance, operational and safety instructions and you will receive years of trouble free service.

IMPORTANT: PLEASE READ THIS MANUAL AND SAVE FOR FUTURE REFERENCE.

General information

• Clearances:	Model	Total End Clearance (in/mm)	Top Clearance (in/mm)
	1AM/1 UP	0.00020/0.0508	0.0015/0.0381
	2AM	0.00025/0.0635	0.0015/0.0381
	2AM *	0.00025/0.0635	0.0025/0.0635
	4AM	0.00035/0.0889	0.0015/0.0381
	4AM *	0.00035/0.0889	0.0025/0.0635
	6AM	0.00035/0.0889	0.0015/0.0381
	8AM	0.00048/0.1219	0.0015/0.0381
	16AM	0.00060/0.1524	0.0015/0.0381

* Models with the last three digits greater than 500 (ie 2AM XXX-501)

- **Vane Life:** Depends upon speed, operating pressure and motor maintenance.
- **Operating Pressure:** 100 psi or below (7 bar)

Product Use Criteria:

- Operate at temperature up to 250°F (121°C).
- Protect unit from dirt and moisture.
- Use ONLY compressed air to drive motor.
- Air lines connected to motor should be the same size or the next size larger than the intake port for efficient output and speed control.
- Protect all surrounding items from exhaust air.
- Bearings are grease packed.
- Use Gast #AD220 or a detergent SAE#10 automotive engine oil for lubricating.



A Unit of **INX** Corporation

ISO 9001 & 14001 CERTIFIED

www.gastmfg.com

Lubrication

Use Gast #AD220 or a detergent SAE #10 automotive engine oil for lubricating. Lubricating is necessary to prevent rust on all moving parts. Excessive moisture in the air line may cause rust or ice to form in the muffler when air expands as it passes through the motor. Install a moisture separator in the air line and an after cooler between compressor and air receiver to help prevent moisture problems.

Manual Lubrication

Shut the air motor down and oil after every 8 hours of operation. Add 10-20 drops of oil to the air motor intake port.

Automatic Lubrication

Adjust inline oiler to feed 1 drop of oil per minute for high speed or continuous duty usage. Do Not overfeed oil or exhaust air may become contaminated.

Check intake and exhaust filters after first 500 hours of operation. Clean filters and determine how frequently filters should be checked during future operation. This one procedure will help assure the product's performance and service life.

Flushing

Flushing this product to remove excessive dirt, foreign particles, moisture or oil that occurs in the operating environment will help to maintain proper vane performance. Flush the motor if it is operating slowly or inefficiently.

Use only Gast #AH255B Flushing Solvent. DO NOT use kerosene or ANY other combustible solvents to flush this product.

1. Disconnect air line and muffler.
2. Add flushing solvent directly into motor. If using liquid solvent, pour several tablespoons directly into the intake port. If using Gast #AH255B, spray solvent for 5-10 seconds into intake port.
3. Rotate the shaft by hand in both directions for a few minutes.
4. **You must wear eye protection for this step.** Cover exhaust with a cloth and reconnect the air line. Slowly apply pressure until there is no trace of solvent in the exhaust air.
5. Listen for changes in the sound of the motor. If motor sounds smooth, you are finished. If motor does not sound like it is running smoothly, installing a service kit will be required. (See "Service Kit Installation").

Check that all external accessories such as relief valves or gauges are attached and are not damaged before operating product.

Shutdown

It is your responsibility to follow proper shutdown procedures to prevent product damage.

1. Turn off air intake supply.
2. Disconnect plumbing.
3. Remove air motor from connected machinery.
4. **Wear eye protection.** Keep away from air stream.
Use clean, dry air to remove condensation.
5. Lubricate motor with a small amount of oil in chamber. Rotate shaft by hand several times.

6. Plug or cap each port.
7. Coat output shaft with oil or grease.
8. Store motor in a dry environment.

SERVICE KIT INSTALLATION

Gast will NOT guarantee field-rebuilt product performance. For performance guarantee, the product must be returned to a Gast authorized service facility.

Service kit contents vary. Most contain vanes, end cap gasket, body gasket, bearings and a muffler element or felt.

Major and Minor Rebuilds

Tool kits which include a more in-depth rebuild manual are available through your Gast distributor.

These kits include the tools required to remove and reassemble end plates, bearings and shaft seals, and to set the proper end clearance. The rebuild manual also includes step by step instructions, including illustrations, to help achieve a successful rebuild. Gast Manufacturing, Inc. highly recommends using the air motor rebuild manual and tool kit when attempting a minor or major rebuild to your Gast air motor.

Minor Rebuild:

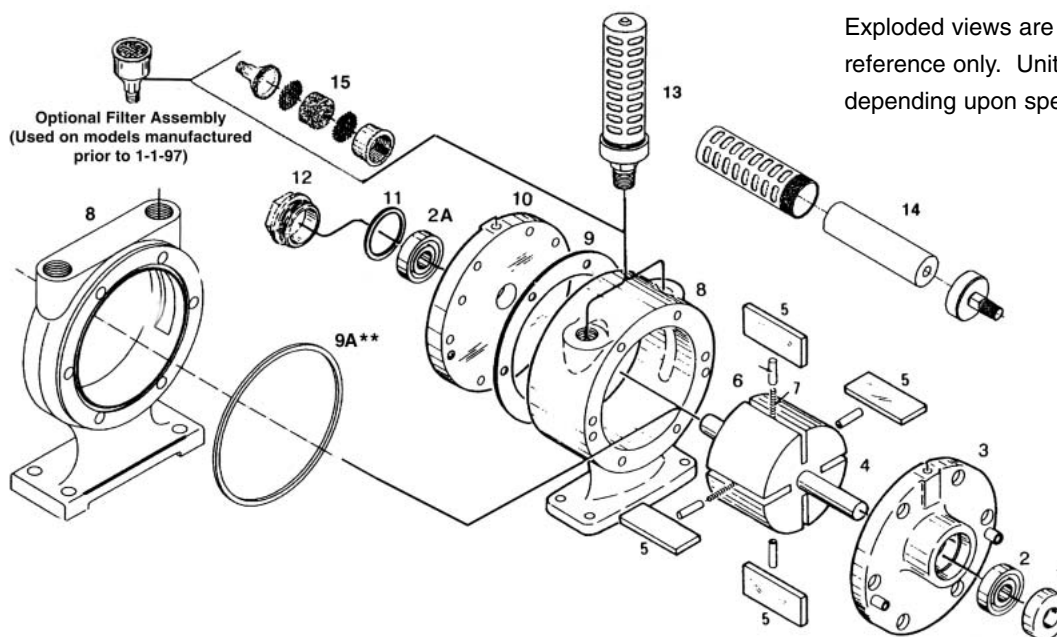
1. Remove the end cap.
2. Remove dead end plate bolts.
3. Remove dead end plate. (Use factory issued tool, do not use screwdriver to remove the end plate.)
4. Remove the dowel pins from the body and push back into end plate until flush or just below the machined surface of the end plate.
5. Remove vanes.
6. Clean parts. Check for scoring on the end plate and rotor assembly. If scoring exists, send unit to a Gast authorized service facility.
7. **Lubricated models only:** Lightly oil and reinstall vanes.
8. Place the proper end plate gasket on the end plate. If the original is damaged, replace with a new one supplied in the Service Kit.
9. Place the dead end plate on the body.
10. Press the bearing onto the shaft using a factory supplied bearing pusher.
11. Tap dowel pins into body and install end plate bolts. Tighten bolts to 75-100 in-lbs.
12. Set end clearance as required by model:
1AM-4AM and NL22-NL52 models - use the bearing taper from kit to lightly tap on inner race of the dead end bearing to free up and center the rotor in the body.
6AM-8AM models - lightly strike the drive end shaft with a soft hammer to push the rotor away from the drive end plate. The rotor must NOT rub on either end plate.
13. Reattach end cap.
14. **If the air motor is lubricated,** apply a few drops of Gast #AD220 lubricant into ports. Rotate shaft by hand for a few rotations.

Major Rebuild:

1. Remove the end cap.
2. Remove dead end plate bolts.

3. Remove dead end plate. (Use factory issued tool, do not use screwdriver to remove the end plate.)
4. Remove the dowel pins from the body and push back into end plate until flush or just below the machined surface of the dead end plate.
5. Remove rotor using an arbor press.
6. Remove vanes and ejection mechanism if reversible. (Ejection mechanisms may consist of vane springs, pins, caps or cam rings.)
7. Remove shaft seal and bearings from drive end plate and bearing from dead end plate. (Use factory issued tool.)
8. Do Not remove drive end plate bolts or drive end plate.
9. Clean parts. Check for scoring on the end plates and rotor assembly. If scoring exists, send unit to a Gast authorized service facility.
10. **For reversible models only:**
1AM and 1UP models - place a new cam ring between the rotor and the drive end plate.
2AM and 4AM models - place springs and caps in rotor.
6AM, 8AM and 16AM models - install push pins.
11. Place the drive shaft of the rotor assembly through the drive end plate. Press the drive bearing onto the drive shaft using a factory supplied bearing pusher.
12. Using the bearing taper from the Tool Kit, lightly tap on inner race of the drive end bearing to snug up rotor to drive end plate.
13. Install new vanes as required by model:
All single rotation units - the angle cuts on the vane face to center of the rotor.
Reversible units 2AM and 4AM - the notch on vane faces to center of the rotor.
6AM, 8AM and 16AM models - install the vane spring lip into the notch at one end of the vane and place in rotor vane slot with spring facing pushpin.
14. Place the proper end plate gasket on the body of dead end. If the original is damaged, replace with a new one supplied in the service kit.
 If your air motor uses O-rings, place the new O-rings in the body groove. Some models do not use end plate gaskets or O-rings.
15. Place the dead end plate on the body.
16. Install the dead end bearing and press into place with bearing pusher tool from tool kit.
17. Install the dowel pins.
18. Fully tighten the remaining bolts to 75-100 in-lbs.
19. Set end clearance as required by model:
1AM-4AM and NL22-NL52 models - use the bearing taper from the Tool Kit and lightly tap on the inner race of the dead end bearing to free up and center the rotor in the body.
6AM-8AM models - lightly strike the drive end shaft with a soft hammer to push the rotor away from the drive end plate. The rotor must NOT rub on either end plate.
20. Apply a small amount of grease to bearing seal and install the drive end bearing seal by pressing flush with bearing pushing tool from Tool Kit.
21. Reattach end cap.
22. **If the air motor is lubricated**, apply a few drops of Gast #AD220 lubricant into ports and rotate shaft by hand for a few rotations.

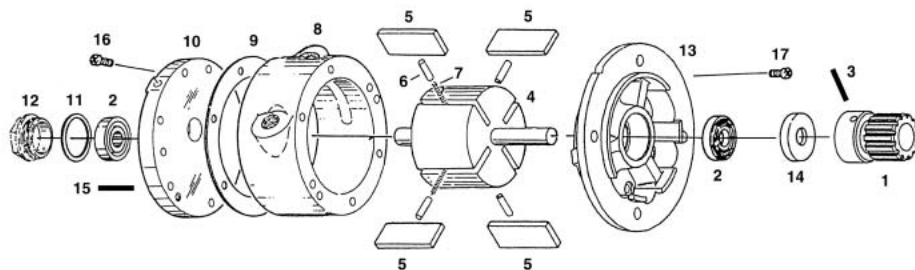
EXPLODED PRODUCT VIEWS, PARTS & ORDERING INFORMATION



Exploded views are shown for reference only. Units may vary depending upon specific model.

4AM SERIES

REF#	DESCRIPTION	QTY	4AM-FRV-13C	4AM-NRV-22B	4AM-FRV-24	4AM-NRV-50C	4AM-NRV-54A	4AM-NRV-70C	4AM-ARV-119 METRIC	4AM-ARV-120 METRIC
1 Δ	SHAFT SEAL	1	AC466B	AC466B	NAS2	B2328	AA466B	B2328	B2328	B2328
2 Δ	DRIVE END BEARING	1	AA299J	AA299J	AA299J	AB519	AA299J	AB519	AB519	AB519
2A Δ	DEAD END BEARING	1	AA299J	AA299J	AA299J	AA299J	AA299J	AA299J	AA299J	AA299J
3	DRIVE END PLATE	1	AC727	AC665	AC727	AG707	AC665	AG707	AK425A	AK425A
4	ROTOR ASSEMBLY	1	AB617	AB617	AM426	AM455A	AM411	AM319A	AM455C	AM455B
5 Δ	VANE	4	AB876	AB876	AB876	AB876	AB876	AB876	AB876	AB876
6 Δ	PUSH PINS	4	AM467	AM467	AM467	AM467	AM467	AM467	AM467	AM467
7 Δ	VANE SPRING	2	AM466	AM466	AM466	AM466	AM466	AM466	AM466	AM466
8	BODY	1	AM425	AM410	AM425	AM410	AM410	AM410	AM410M	AM410M
9 Δ **	SHIMS	2	B330	B330	B330	B330	B330	B330	B330	B330
10	DEAD END PLATE	1	AC728	AC728	AC727	AC728	AC728	AC728	AB622M	AB622M
11 Δ	END CAP GASKET	1	AA46	AA46		AA46	AA46	AA46	AA46	AA46
12	DEAD END CAP	1	AM307D	AM307D		AM307D	AM307D	AM307D	AM307D	AM307D
13	MUFFLER ASSEMBLY	1	AL445	AL445	AL445	AL445	AL445	AL445	AL445	AL445
14 Δ	MUFFLER CARTRIDGE	1	AL458	AL458	AL458	AL458	AL458	AL458	AL458	AL458
15 Δ	MUFFLER FELT	1	AC983	AC983	AC983	AC983	AC983	AC983	AC983	AC983
***	SERVICE KIT	1	K205	K205	K205G	K206A	K279	K280A	K206C	K206B



4AM SERIES

REF#	DESCRIPTION	QTY	4AM-RV-75
1	GEAR STD.	1	AA294
2 Δ	BEARING	2	AA299J
3	PIN	1	AA297
4	ROTOR	1	AA293
5 Δ	VANE	4	AB876
6 Δ	SPRING PIN	4	AM467
7 Δ	SPRINGS	2	AM466
8	BODY	1	AM410
9 Δ	SHIMS	2	B330
10	DEAD END PLATE	1	AC728
11 Δ	END CAP GASKET	1	AA46
12	END CAP	1	AM307D
13	DRIVE END PLATE	1	AA424
14	SEAL	1	AA466B
15	DOWEL PINS	4	AB162
16	1/4-28 x .50 PFHMS	6	BB631
17	1/4-28 x .625 SHCS	6	BB634
***	SERVICE KIT	1	K205

*** Item not shown.

** #AL484 (9A) O-ring replaces shims on some models.

Δ Denotes parts included in the Service Kit.

Parts listed are for stock models. For specific OEM models, please consult the factory. When corresponding or ordering parts, please give complete model and serial numbers.

PART NO. 45-200 D170PL (Rev. D)

TROUBLESHOOTING CHART

Problem					
Low Torque	Low Speed	Won't Run	Runs Hot	Runs Well Then Slows Down	Reason & Remedy For Problem.
●	●	●			Dirt or foreign material present. Inspect and clean.
●	●	●			Internal rust. Inspect and clean.
●	●	●	●	●	Vanes misaligned. Realign vanes.
●	●				Low air pressure. Increase pressure.
	●				Air line too small. Install larger line(s).
	●			●	Restricted exhaust. Inspect and repair.
●	●	●		●	Motor is jammed. Disassemble and repair.
	●			●	Air source inadequate. Inspect and repair.
	●			●	Air source too far from motor. Reconfigure setup.

AUTHORIZED SERVICE FACILITIES

Gast Manufacturing Inc.
2550 Meadowbrook Road
Benton Harbor, MI 49022
TEL: 616-926-6171
FAX: 616-927-0808
www.gastmfg.com

Gast Manufacturing Inc.
505 Washington Ave
Carlstadt, NJ 07072
TEL: 201-933-8484
FAX: 201-933-5545

Brenner Fiedler & Assoc.
13824 Bentley Place
Cerritos, CA 90701
TEL: 800-843-5558
TEL: 310-404-2721
FAX: 310-404-7975

Gast Manufacturing Co., Ltd
Beech House, Knaves Beech
Business Centre, Loudwater
High Wycombe, Bucks HP 10 9SD
England
TEL: 44 628 532600
FAX: 44 628 532470

Wainbee Limited
215 Brunswick Blvd.
Pointe Claire, Quebec
Canada H9R 4R7
TEL: 514-697-8810
FAX: 514-697-3070

Wainbee Limited
5789 Coopers Avenue
Mississauga, Ontario
Canada L4Z 3S6
TEL: 905-568-1700
FAX: 905-568-0083

Japan Machinery Co., Ltd.
Central PO Box 1451
Tokyo, 100-91 Japan
TEL: 81-3-3573-5421
FAX: 81-3-3571-7865
or: 81-3-3571-7896

General Correspondence
should be sent to:
Gast Mfg. Inc./A Unit of IDEX Corporation
P O Box 97
Benton Harbor, MI 49023-0097



ISO 9001 & 14001 CERTIFIED

www.gastmfg.com

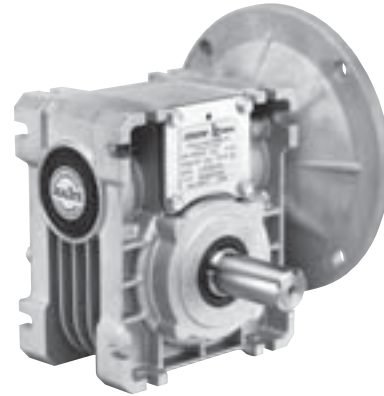
INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS FOR COBRA™ - WORM GEAR REDUCERS

Emerson Power Transmission

P O Box 687
MAYSVILLE, KY 41056
Phone: 800-626-2093
www.emerson-ept.com

F O R M
8619-B
Revised
January, 2003

for your safety, read and retain this manual.



SAFETY FIRST

High voltage and rotating parts can cause serious or fatal injury. Safe installation, operation and maintenance must be performed by qualified personnel. Familiarization with and adherence to NEMA MG2, the National Electrical Code and local codes is recommended. It is important to observe safety precautions to protect personnel from possible injury. Personnel should be instructed to:

1. Avoid contact with energized circuits or rotating parts.
2. Disconnect all power sources before initiating any maintenance or repair.
3. Act with care in accordance with prescribed procedures in handling and lifting this equipment.
4. Be sure unit is electrically grounded in accordance with code requirements.
5. Be sure equipment is properly enclosed to prevent access by children or other unauthorized personnel in order to prevent possible accidents.
6. Be sure shaft key is fully captive before unit is energized.
7. Provide proper safeguards for personnel against rotating parts and applications involving high inertia loads which can cause overspeed.
8. Avoid extended exposure to equipment with high noise levels.
9. Be familiar with the equipment and read all instructions thoroughly before installing or working on equipment.

INSPECTION

Inspect unit to make sure no damage has occurred during shipment.

STORAGE

Units should be stored in a clean, dry location. If units are to be stored for over six months, refer to Emerson Power Transmission.

MOUNTING

Mount units to a firm, flat surface which is sufficiently rigid to prevent vibration. Drive belts and chains should be within recommended limits of tightness. Couplings should be properly aligned and balanced. For drive recommendations refer to drive or equipment manufacturer or to Emerson Power Transmission.

▲WARNING Guards should be provided for all exposed rotating parts to prevent possible personal injury. Keep fingers and foreign objects away from ventilation and other openings. Applications involving HIGH INERTIA LOADS may damage this equipment due to motor overspeed during shut down. Such applications should be referred to Emerson Power Transmission.

▲CAUTION Do not force drive coupling or other equipment onto shaft, as bearing damage may result.

OIL LUBRICATION

This unit is equipped with an expansion chamber. A vent plug is not necessary and should not be used.

COBRA™ reducers are shipped with a sufficient amount of oil to provide adequate lubrication in any of the mounting positions illustrated. Minimum allowable ambient temperatures for Standard Unit is -10°C (-14°F).

For applications operating in elevations above 3300 ft. the internal reducer pressure should be equalized before placing in service. Loosen and re-tighten the pipe plug located in the bottom of the reducer to accomplish this.

The lubricant supplied in COBRA is AGMA #7 synthetic hydrocarbon based oil.

When changing from one type of lubricant to another, it is recommended that the unit be drained, filled to proper level with the new lubricant and run for 24 hours. Drain the lubricant a second time and refill to proper level.

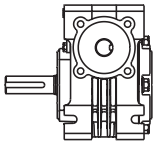
The company names and the names of the lubricants mentioned in this document are the tradenames, trademarks and logotypes of the respective companies and are not owned by Emerson Power Transmission.

	<p>▲WARNING</p> <p>High voltage and rotating parts may cause serious or fatal injury.</p> <p>Turn off power to install or service.</p> <p>Operate with guards in place.</p> <p>Read and follow all instructions.</p>	
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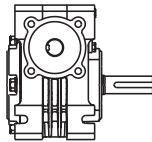
▲WARNING Disconnect all power before adjusting units

ASSEMBLY POSITIONS

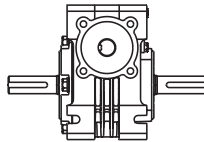
L



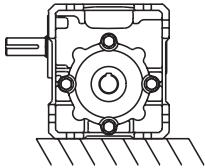
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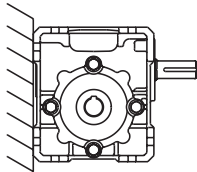
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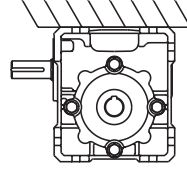
MOUNTING SURFACES



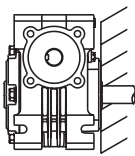
FLOOR



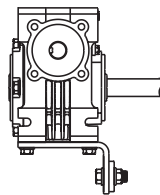
WALL



CEILING



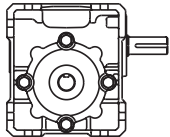
FACE MOUNT



SHAFT MOUNT

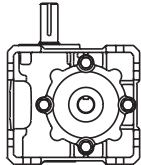
MOUNTING POSITIONS

WT

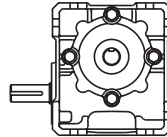


WVU

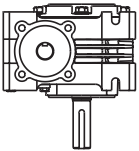
See Note



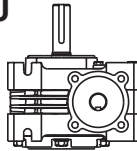
WB



OVD

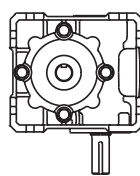


OVU

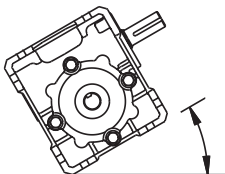


WVD

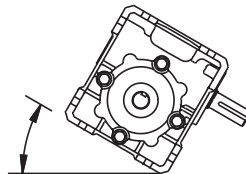
See Note



ANGLE MOUNTING POSITIONS



0° TO 30°



0° TO 30°

NOTE: For angle mounting greater than 30 (deg), WVU or WVD positions, consult EPT Technical Services.

WARRANTY SERVICE

For Warranty Service call:
 Emerson Power Transmission
 MAYSVILLE, KY 41056
 Phone (800) 626-2093 Fax (606) 564-2079
 Give complete Nameplate Data, including
 Identification Number