



Installation

Operation and

Maintenance Manual

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S16L-4

Series 600 Vari-Angle Mixers - Installation

- Remove blank cover plate from tank manway and check mixer mount for correct size, hole location and orientation.
- Mount propeller and prop lock onto shaft IF manway is large enough for propeller to "roll through".
- Install gasket and bolt mixer mount with mixer to manway. Installation can be facilitated by approaching the tank with the mixer on the LEFT.

CAUTION- mixer pinion shaft must be vertical when mixer is bolted to manway.

 Mount electrical motor to motor mount, if not mounted at factory. Install motor mount with motor on top of the mixer, lining up the holes and installing cap screws. Align motor coupling alignment.





Series 600 Fixed Angle Mixers - Installation

- Remove blank tank cover plate from tank manway and check mixer mount, if ordered from factory, for correct size, hole location and orientation.
- If mixer mount is not ordered from factory, burn hole nozzle in the blank mixer mount as follows:

MODEL	NOZZLE	HOLE
605	6″ 150# 7º	6 7/8 I.D. (175 mm)
620	8″ 150# 7º	8 7/8 I.D. (225 mm)
650	10″ 150# 10º	11 1/8 I.D. (283 mm)
680	12″ 150# 10º	13 1/8 I.D. (333 mm)

[Allow at least 12" (309 mm) clearance between tip of propeller and tank floor. Nozzle may be mounted as low on plate as welding of nozzle and gussets permits, keeping proper propeller clearance in mind.]

- Insert nozzle in burned hole and weld after orienting "top" correctly.
- 4. Install Gasket and bolt mixer to nozzle. CAUTION
 The mixer pinion shaft must be in line with "top" stamped on the thickness of the nozzle.
- Mount propeller and prop lock onto shaft if manway is large enough for propeller to "roll through".
- Install gasket and bolt mixer mount with mixer to manway. CAUTION- Mixer pinion shaft must be vertical when mixer is bolted on manway.
- Mount electric motor to motor mount if not mounted at factory. Install motor mount, with motor on top of the mixer, lining up the holes and installing cap screw. For motor coupling alignment, see page 5.



Manway Propeller ROLL-THROUGH clearances:

↓ H ↓	N	∕lanway depth	Prop	eller	size /N	∕lanw	ay I.D.	
		н	20	23	26	29	32	35
200 E		4	14	16	17	19	20	22
Deni		5	15	16	18	19	21	22
way C		6	16	17	19	20	22	24
Wan		7	16	17	19	22	24	25
		8	18	19	20	23	25	26
		9	18	19	20	24	26	28
Front of Pl	opeller Hub	10	18	20	22	24	27	29
STATISTIC	DHADETE BYBONHO	11	18	21	22	25	27	30
8	ADA BOL	12	19	21	22	25	28	30
		13	19	21	22	26	29	32
		14	21	22	24	27	30	34
		15	21	22	25	28	30	34
	Example: A	29" prop	eller v	will ro	otate t	hroug	h a 23	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,

Example: A 29" propeller will rotate through a 23" manway I.D. provided the depth of opening is 8" or less

Alignment of motor coupling

Jensen Series 600 Mixer couplings have precisely machined edges for easy alignment using only

- a straight edge. The following adjustment points on the motor mount are used for coupling alignment:
- (A) Oversize hole in motor.
- (B) Shims under motor feet are used for parallel and angular alignment.
- (C) Set screw is used for angular alignment and adjustment of the gap between coupling halves.
- (D) Oversized holes in the motor mount base are used for parallel alignment. Very small final adjustments are made by tapping or bumping the motor mount while the base bolts are snug but not tight.



Flexible Coupling Element Installation

For coupling element replacement

- Perform electrical lockout.
- Remove the coupling cover.
- Remove the bolts on the motor and gearbox coupling halves.
- The flexible element will now slide out.

To install the flexible element

- Position as shown with one cap screw installed on top and bottom.
- Pivot the element into position.
- Insert the rest of the bolts into the flexible element.
- Tighten to the torque values shown below.



Model	Torque	GAP
605	120 lb-in	1.06" (27mm)
620	120 lb-in	1.12" (29mm)
650	240 lb-in	1.38" (35mm)
680	240 lb-in	1.5" (38mm)





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<u>Propeller Clearance & Fluid Levels</u>

Almost every vibration problem experienced with Jensen Mixers has proved to be a result of too little clearance between tank walls or floors and the mixer propeller. Operation of mixers with low fluid levels in the tank will cause air to be drawn into the propeller flow stream and will also cause vibration.

Propeller	Fluid Level Above	Clearance between
Diameter	Propeller Centerline	Prop Tip & Floor
35" (889mm)	10' (3.1m)	12" (305mm)
32" (813mm)	8' (3.1m)	12" (305mm)
29" (737mm)	7' (2.1m)	12" (305mm)
26" (660mm)	6' (1.9m)	10" (254mm)
23" (584mm)	6' (1.9m)	8" (203mm)
20" (508mm)	4' (1.3m)	8" (203mm)

Pre-Startup: Fixed and Vari-Angle Mixers

Before Initial Mixer Startup:

- Once fluid level is above the mixer, remove the upper vent plug and open the valve until all the trapped air has been released and the mixer is filled with tank fluid. Close the valve and replace the plug. (Warning: As the mixer fills, some tank fluid may escape through the vent tube.)
- Fill gearbox with oil to the bottom of the threads on fill hole.
 Start the mixer and run for 10 minutes. While mixer is still running fill to bottom of the threads again.
- 3. Confirm correct rotation direction.
- 4. Because the assembly of the mixer is done in a dry environment, some adjustment of the vari-angle ball packing will be necessary after the tank is filled with product. If excessive leakage occurs around the ball, simply tighten the four nuts at the packing gland evenly until the leakage is reduced to a minimum. Some tightening may be necessary after the machine has operated for a short while.
- 5. Change oil (while HOT) after first 10 hours operation.

Periodic Maintenance for normal operation:

- WEEKLY: Observe lower indicator glass on First Watch for fluid, this will be indication of seal issues.
- WEEKLY: Check external moving parts for abnormal wear or misalignment.
- MONTHLY: With the mixer running, check for noise and vibration. (See Troubleshooting if occurs)
- ANNUALLY: Change oil once each year and inspect flexible coupling. IF UNIT OPERATED CONTINUALLY CHANGE OIL QUARTERLY AND INSPECT COUPLING.

Run-in requirements:

Jensen Mixers do not require any special run-in procedure. However, gearbox oil should be changed (while hot) after the first 10 hours operation.

Normal Operation: Change once seasonally, inspect regularly.

- To Inspect Oil Level: Remove fill plug. If indicator bar inside gear box is visible, oil is too low. Fill to bottom of threads.
- To Change Oil: While oil is hot, remove drain plug and drain. Replace plug and fill to bottom of threads. Then start mixer and again fill to bottom of threads.





Mixer Operation:

600 Variable Angle Mixers

Mixers with existing sediment accumulation should be operated continuously as long as fluid level is two and a half times the diameter of the propeller above the arc of the upper propeller tip and sediment content in outgoing stream is acceptable. Mixer angle variation from full left to full right and to center should be made periodically – once each day during continuous running. Mixer equipped with Jensen Variable Angle actuators automatically reposition themselves.

Mixers to be used as effective sediment control on clean tanks, start mixer 4 hours before pump-out begins and continue until tank is half full. This procedure will need to be modified to suit climate and conditions. In controlling sediment, angle variation need be made only about once each quarter. Mixers equipped with the Jensen Variable Angle actuator will automatically make all angle changes. No scheduling or other attention is necessary.

600 Fixed Angle Mixers

Jensen Fixed Angle Mixers are recommended for blending in accordance with your company's specification furnished at time of purchase. Blending times, fluid characteristics, operating procedures etc., are spelled out in this specification. If operating procedure have not been specified, Jensen recommends:

•If fluids to be mixed are pumped into tank at the same time, operate mixer during filling.

•If fluids to be mixed are already blended and purpose of mixer is to prevent stratification, automatic timer control is recommended with a cycle of 2 hours on, 6 hours off.

•If fixed angle mixers are to be used for reducing sediment deposits in crude oil storage tanks, use the operating procedure recommended under "Vari-Angle Mixers".

Mechanical Seal Replacement for models 605, 620 and 650

1. If appropriate familiarize yourself with the Jensen FIRST-WATCH system.



2. Remove end bearing cap by first loosening vertical pinch bolt and horizontal cap-to-gearcase bolt. Do not operate mixer with end bearing cap removed.

- 3. Rotate the drive yoke so that "Pull-Turn" printed on the yoke is in the 12 o'clock position.
- 4. Remove the bolts from the drive yoke.
- 5. Pull the yoke back to stop (1/2" to 1-1/4"), and then turn it counter-

clockwise till lock engages and shaft stops (90 degrees or more). This seals off the tank contents. If the yoke cannot be pulled back



by hand, jack screw holes are provided in the yoke.

6. Remove shaft bolt, drive yoke and key. Mechanical



that the seal drive pin is located over the shaft keyway. If

the seal is to be replaced, push new seal onto shaft, also rotating the seal counter-clockwise only, and observe the rest of this procedure. Be sure the seal drive pin extends into the hole above the keyway in the drive yoke.

- 8. Install the key and the yoke. Note that the yoke must be sliding fit on the shaft. (Anti-seize is recommended)
- 9. Slide the thrust bearing over the shaft and the yoke, securing it with a cap screw to the end of shaft.
- 10. Unlock the mixer shaft and slide it forward till the yoke engages with the drive sleeve fully. It will be forced away from the drive sleeve about ¼ inch by the seal spring tension. Do not force the voke against the drive sleeve by using the voke



Do not force the yoke against the drive sleeve by using the yoke cap screw except to take up the seal spring tension.

- 11. Bolt the yoke to the drive sleeve. Slip the yoke cover over the thrust bearing and secure it with the housing bolts.
- 12. Now vent the mixer by carefully opening the vent valve (or plug) and either filling with light oil or some material compatible with tank contents, then closing the valve or replacing plug.
- 13. Do not tighten the pinch bolt (on 605/620/650) until after the mixer has had a chance to run for a few minutes. This stabilizes the location of the thrust bearing.

Mechanical Seal Replacement Model 680

1. If appropriate familiarize yourself with the Jensen FIRST-WATCH system.



2. Remove (4) horizontal bearing housing – to –bearing cap screws.
(B) Remove horizontal bearing cap-to-gearcase bolts (C) take off bearing cap. Do not operate mixer with bearing cap removed.

 Remove the yoke-to-drive sleeve bolts (D) Rotate the yoke so that "pull-Lock" on the yoke is facing up.

4. Pull the yoke back (A) approximately $\frac{1}{2}$ " to 1 $\frac{1}{4}$ " and





rotate ¼ turn counter clockwise until lock engages and shaft stops (90°) or

more (B) This seals off the tank contents and holds the shaft securely. If the yoke is difficult to pull back by hand, jack screw holes in the yoke flange may be used as a light duty puller only. If strong resistance is

encountered, use a wheel or bearing puller.5. Remove the shaft bolt, then the thrust bearing assembly. Note that the thrust bearing

assembly comes off as a unit. It is not necessary to disassemble the unit unless the bearing is to be replaced.



6. Remove the yoke. Note the position of the seal drive pin opposite the shaft keyway. When reassembling the mixer, be

sure that the matching hole in the yoke aligns with this drive pin.7. If the drive pin and the yoke hole are not properly aligned, the mechanical seal could be destroyed.

8. To remove the seal, simply pull it carefully off the shaft with a counter-clockwise, twisting motion.

Reassembly Notes

- Install seal, noting location of driving pin.
- Install Yoke key and Yoke—Confirm the seal drive pin extends into the receiving hole in the drive yoke.
- Install bearing assembly and shaft bolt.
- Rotate Yoke and push forward to engage mechanical seal and unlock mixer.
- Install Yoke bolts and torque to specifications.
- Install Yoke Cap and install 4 cap bolts and 4 bearing bolts.
- Follow startup procedures.







Know your First Watch System

If product can be seen in TOP PORT (3/4 NPT) immediate action <u>MUST</u> be taken. If action is delayed it <u>WILL</u> result in loss of product.

If product can be seen in the middle port (1" NPT) immediate action should be taken. If action is delayed it could result in loss of product.

This is the preferred port for customer installed remote sensing.

A technician can tell with a simple glance the condition of the sealing system.

<u>Green</u> = Good. System is operating normal.

<u>Red</u> = System needs attention. Product is leaking which could be an indication that the mechanical seal has reached the end of its life.



To drain the FIRST WATCH reservoir:

- 1) Remove the plug at the base of the reservoir valve.
- 2) Turn the handle to open the valve.
- 3) Reverse the process to put back into service.

In the case of a seal change the hose may remain connected to the yoke cap.

For questions please contact us at

1-800-826-5646 or 918-627-5770.

Thank you for choosing JENSEN MIXERS.





Gearbox Removal

- 1. Remove mechanical seal
- 2. Remove bolt in motor half of flexible coupling.
- Drain shaft sleeve by removing plug shown at (A) of the illustration.
- 4. Drain the gearbox oil by removing plug at (B).
- 5. Remove the nut from the mixer body at (C).
- Support the gearbox evenly and slide it off the body studs. When it is free of the studs, slide it off the propeller shaft.

To reinstall the gearbox, first clean the shaft of any dirt or grit, then proceed as follows:



Gear Inspection

Remove two bolts retaining pinion assembly. Remove pinion assembly. If necessary, the housing may be pried upwards at the joint between the pinion housing flange and the gearcase. The condition of the gear set and bearing can be determined from the contact pattern on the gear teeth. The contact pattern is also used as a check on adjustment after rebuilding.



Reinstalling Gearbox

Loosen the pinch bolt at the side of the yoke cover, releasing the thrust bearing from the yoke cover. (The 680 gearbox has no pinch bolts, but requires the removal of the four hex-head cap screws on the back face of the yoke cover.)

Remove the yoke cover, thrust bearing assembly and yoke from the gearbox.

Slide the gearbox over the mixer shaft carefully (so as not to unlock the tank seal) and reinstall nuts at the mixer body.

Realign the gearbox to the motor, leveling the coupling upper face.

Install the key and the yoke. Note that the yoke must be a sliding fit on the shaft.

Slide the trust bearing over the shaft and the yoke, securing it with a cap screw to the end of the shaft.

Unlock the mixer shaft and slide it forward till the yoke engages with the drive sleeve fully. It will be forced away from the drive sleeve about ¼ inch by the seal spring tension. Do not force the yoke against the drive sleeve by using the yoke cap screw except to take up the seal spring tension. Bolt the yoke to the drive sleeve. Slip the yoke cover over the thrust bearing assembly and secure it with the housing bolts.

Now vent the mixer by carefully opening the vent plug and either filling with light oil or some material compatible with the tank contents, then replacing the plug.

Rotate the input coupling by hand four turns before turning on electric power to the motor.

Do not tighten the pinch bolt until after the mixer has had a chance to run for a few minutes, stabilizing the location of the thrust bearing.

Field service and inspection on Jensen Series 600 Mixers requires only basic hand tools. The following list will allow removal of all major components

Wrenches (2 each) 7/16", 1/2", 9/16", 3/4", 15/16"

One adjustable wrench (3/4 jaw opening)

Two large screwdrivers.

Ring Gear

Pinion Nut

Fastener Location 605 620 650 – 680 Size Size Torque Size Torque Torque **Coupling Element** 1/4 120 in-lb 1/4 120 in-lb 5/16 240 in-lb Yoke/Drive Sleeve 5/16 75 in-lb 3/8 120 in-lb 1/2 360 in-lb GB Case / Cover 3/8 120 in-lb 3/8 120 in-lb 3/8 120 in-lb Yoke Cap 1/2 30 ft-lb 1/2 30 in-lb 5/8 70 ft-lb 5/8 **Pinion Housing** 1/2 30 ft-lb 30 ft-lb 70 ft-lb 1/2 Yoke & Prop / Shaft 1/2 1/2 30 ft-lb 1/2 30 ft-lb 30 ft-lb 5/8 GB / Mixer Flange 1/2 30 ft-lb 5/8 70 ft-lb 70 ft-lb 3/8 40 ft-lb 3/8 40 ft-lb 1/2 100 ft-lb

80 ft-lb

Recommended Fastener Torque Values

140 in-lb

160 in-lb

Pinion Bearing and Gear Replacement

Disassembly

- 1. Clamp pinion teeth in a vise equipped with soft jaws to prevent damage.
- 2. Remove pinion nut.
- 3. Remove coupling half. Pry between coupling and pinion housing or use a bearing puller to start it off.
- 4. Tap the housing upwards lightly with a rubber mallet, then lift it off.
- 5. Pull both bearings. If either bearing is damaged, replace both.



Reassembly

Reverse the procedure above. Start by using the same shim thickness under bearing as the original assembly; this will serve as a starting point. When reassembled, the pinion housing should turn freely, but with no slack that can be felt by rocking the housing. If it is too tight, disassemble and add shims under the upper bearing; if it is too loose, reduce shim thickness. There should be no measurable preload on this assembly.

Pinion Depth Adjustment

The distance from the bottom face of the pinion to the housing flange

Model		"M" Dimensions
	605	2.688" (68.275 mm)
	620	3.000" (76.200 mm)
	650 & 680	3.500" (88.900 mm)

If (M) is greater than it should be, shims must be added as shown. If the outside of the upper case flange is stamped with a number such as +002, add .002" to the shim requirement. If stamped number is -001, deduct .001" from the shims required.

Replace O-ring

Put pinion assembly in gearcase and install bolts. Torque to specifications.



Gear Set Contact Pattern

- Using a suitable marking compound, check the contact pattern. If the markings look like the first depiction, the pattern is to accepted standards.
- Gears are cut with a contact pattern about half the length of the tooth, the location slightly favoring the toe end of the tooth. Under load the pattern will shift somewhat toward the heel of the tooth, and thus

become more central, under no circumstances must the pattern be concentrated on the ends of the teeth.

Driver Side

- If the contact pattern looks like the second depiction, remove shims between the case and pinion bearing housing. This pattern indicates that the pinion is sitting too high.
- If the contact pattern looks like the third depiction add shims between the case and pinion bearing housing. This pattern indicates that the pinion is sitting to low.

Ring Gear and Main Bearing Replacement

Disassembly

Clamp gearbox cover on workbench with the small end up. Remove the case / cover bolts and lift off the gearcase. Lift the drive sleeve up off the body. The gear and bearing should be inspected at this point. Replace if gears or bearings are excessively worn or loose. A bearing puller may be required to remove the main bearing from the drive sleeve.







Coast Side



Reassemble – Backlash Adjustment

- 1. Bolt ring gear to drive sleeve. See recommended torque values.
- 2. Press main bearing onto drive sleeve.
- 3. Position the drive sleeve back over the body without shims.
- Position gearcase, with pinion assembly, over the drive sleeve. Do not install case/body bolts or the oil seal.
- 5. Bolt a bar to the drive sleeve as shown. Swing the bar back and forth through a short arc until the backlash gap can be felt. Move the bar clockwise until tooth contact can just be noticed.

Carefully clamp a bar on the coupling half so that it barely touches the left side of the drive sleeve bar. Move the drive sleeve bar counterclockwise until tooth contact is just felt again. Measure the gap between the bars. When the backlash is correct, this gap will correspond to the values shown on the illustration.



6. Since no shims were installed this first time, they will probably have to be added now to correct the contact of the ring and pinion. Once complete

reassemble drive-sleeve and gearcase. Re-measure and repeat this process until the backlash is in the specified range.

- 7. When the adjustment is correct, remove the case and position the case / body O-ring, replace the case and fasten the case/body cap screws.
- 8. Install the oil seal.



Shaft Bearing Inspection

When the gearbox is removed for repairs, it is important that the shaft bearing be inspected. Proceed once tank product is below centerline of mixer:

- Once the gearbox has been removed, the inner sleeve which holds the shaft bearing can be removed. A groove is provided on the exposed end of the inner sleeve; a pair of screwdrivers may be used here to extract the inner tube.
- The shaft bearing is located inside the inner sleeve at the propeller end. If it is badly worn or scored, it should be replaced.



- The bushing material is solid tungsten carbide for greatest resistance to wear in the most abrasive environments. If it is worn it will be necessary to replace the entire inner tube assembly.
- 4. To reinstall the inner sleeve, position the lugs on the gearbox end of the sleeve vertically, then push the sleeve in until it stops. Replace the O-ring on the outside of the sleeve.
- 5. We recommend when mixing light products such as gasoline or materials containing abrasive matter, the inner sleeve be removed and the TC bushing be inspected at least once every two years.

Shaft Wear Sleeve

Jensen Series 600 mixers (excluding HT models) are equipped with a reversible shaft wear sleeve. When the tank is out of service for periodic maintenance, the wear sleeve should be inspected. If it



is badly worn or scored, it should be reversed or replaced. To change the sleeve, remove the propeller and shaft lock bushing, reverse the wear sleeve and reassemble. See part 5 under Shaft Bearing Inspection.

Long Term Shaft Lock Securing Device

Pipe dimensions required / If cap, yoke, and

seal are removed

Model	В	Pipe Size
605	3 7/8"	3" IPS
620	5 1/8"	4" IPS
650	5 7/8"	4" IPS
680	6 3/8"	6" IPS

Washer: with a 5/8" hole and OD larger than pipe. Size and shape unimportant.

Install as shown. Use standard shaft cap screw in end of shaft. Screw should be snug – not tight.



For all normal seal maintenance the shaft lock ring will provide adequate security for the tank shutoff device. If it becomes necessary during mechanical seal or gearbox maintenance to leave the mixer unattended for any appreciable length of time, we recommend that this shaft lock securing device be fabricated and installed. We particularly recommend this procedure where two or more mixers are installed in a tank. The fluid flow from one mixer may tend to turn the propeller of the mixer being serviced, causing the tank shutoff device to disengage.

Dimensions Required (if gearbox is removed)



Model	А	Pipe Size
605	13 1/4"	3" IPS
620	16 1/4"	4" IPS
650	20"	4" IPS
680	21 3/4"	6" IPS

Washer: 5/8" dia. Hole. OD larger than pipe. Size and shape unimportant.

Install as shown. Use standard shaft cap screw in end of shaft. Screw should be snug – not tight.



To: Distribution

Re: API 650 Torque Values

From: Applications Engineering

Date: February 2004

Bolt Torque Values for API 650

Roof Manholes and Shell Manholes

Roof Manholes

Roof manholes should not present any sealing problems since they see no pressure or media. The 20" and 24" standard roof manholes use 16 and 20, 5/8" bolts respectively. API 650 specifies full-face gaskets. We would recommend the following torques for full-face gaskets.

20" Roof Manhole - 78 ft.lbs. to 120 ft.lbs. (23,400 psi to 60,000 psi bolt stress)

(Resulting Gasket Stress = 600 psi to 923 psi)

24" Roof Manhole - 73 ft.lbs. to 120 ft.lbs. (21,900 psi to 60,000 psi bolt stress)

(Resulting Gasket Stress = 600 psi to 986 psi)

The available gasket stresses shown above are well suited for rubber gaskets. To safely attain these torque values ASTM A193 B7 bolts are required.

Shell Manholes

Shell manholes see head pressure from the liquid media inside the vessel. API 650 specifies that "long fiber sheet" gaskets be used. For all the manhole sizes, Garlock's minimum compressive stresses can not be achieved. However, compressed non-asbestos materials have worked successfully. This can be attributed to the fact that we are sealing against liquid and the pressures are very low. The torques given in the following tables are based on developing a bolt stress of 60,000 psi to 75,000 psi in 34" bolts, specified for all the shell manhole sizes. Therefore, ASTM A193 B7 or bolting with equal or greater yield strength must be used.

	Gask	et Compressive	Stresses for Ring	Gaskets (psi)	37
Nominal Shell Manhole Size	Number of ¾* Bolts	Gasket Stress at 60ksi Bolt Stress	Bolt Torque at 60ksi Bolt Stress	Gasket Stress at 75ksi Bolt Stress	Bolt Torque at 75ksi Bolt Stress
20"	28	2648 psi	200 ft.lbs.	3310 psi	250 ft.lbs.
24"	28	2252 psi	200 ft.lbs.	2815 psi	250 ft.lbs.
30"	42	2757 psi	200 ft.lbs.	3446 psi	250 ft.lbs.
36"	42	2330 psi	200 ft.lbs.	2913 psi	250 ft.lbs.

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Debtor in Posession

Type "F" Mechanical Seal Parts Drawing



ITEM #	DESCRIPTION
1	SPRING
3	'O' RING
4	'O' RING
6	DRIVE PIN LONG
7	DRIVE PIN SHORT
8	'O' RING
9	SNAP RING
10	SLEEVE
11	STATIONARY FACE
12	ROTATING FACE
13 KIT	WEARING PARTS

IMPORTANT

WHEN ORDERING PARTS GIVE THE MIXER MODEL, SERIAL NO., ITEM NO. AND PART NAME.

NOTES: *THE NUMBER OF SPRINGS WILL VARY DEPENDING UPON THE SIZE OF THE SEAL. *THE NUMBER OF DRIVE PINS WILL VARY DEPENDING UPON THE SIZE OF THE SEAL.

**ITEM 13 CONSISTS OF ITEMS 1, 3, 4, 8, 9, 11 &12.

Lubrication schedule

Your Jensen Mixer International, Inc. mechanical actuator has been lubricated and grease-packed with high quality Moly E.P. semi-synthetic grease at the factory.

For maximum protection and long life, grease regularly as specified with the recommended lubricant or equivalent.

Grease Lubrication Intervals

Unit	Check	Repack
Drive Unit	Every 6 Months	Every 2 Years
Actuator Unit	Every 6 Months	Every 2 Years
Linkage Rod Zerks	Every 6 Months	Every 6 Months
Hinge Zerks	Every 6 Months	Every 6 Months

Gearbox Recommended Lubrication based on yearly temperatures.

-20 degrees F (-29 degrees C) to 100 degrees F (38 degrees C) SAE 80 Multi-purpose gear lube (EP) 0 degrees F (-18 degrees C) to 120 degrees F (49 degrees C) SAE 90 Multi-purpose gear lube (EP)

32 degrees F (0 degrees C) up...... SAE 140 Multi-purpose gear lube (EP)

Trouble Shooting Guide

 Oil leakage from Gear- box 	A. Faulty or worn mechanical seal.B. Faulty O-Ring.
2. Clicking Noise	 A. Misaligned motor. B. Misaligned Coupling. C. Low oil in Gearbox. C. Loose belt.
 Vibration If Vibration above .5 IN/ SEC PEAK LEVELS is ob- served shut unit down. 	 A. Not enough clearance between propeller and tank wall. B. Bent or damaged propeller blade. C. Not enough fluid above mixer shaft. D. Bad main bearing. E. Worn shaft bearing. F. Motor running backwards. G. Diffuser or other inlet pointed toward mixer. H. Change of Tank fluid conditions.
4. Excessive belt wear	 A. Check for belt slip or worn pulley. B. Check for oil or rubber solvent on belt pulleys. C. Check for heat or chemical fumes. Belt should not get above 140 F. (60 C). D. Check motor misalignment. E. Check Belt Tension. F. Foreign material embedded into belt
5. Hot electric motor	A. Current overload.B. Bad motor bearing.C. Change of Tank fluid conditions.















ITEM	PART NAME	ITEM	PART NAME
06	RING	27	O-RING, SHAFT
07	THRUST BEARING	28	CASE
08	THRUST RING	30	COUPLING HUB
11	YOKE	31	GEAR SET W/ CAP SCREWS
12	BEARING, UPPER PINION	32	O-RING, BODY
13	BUSHING, UPPER PINION	34	MAIN BEARING
14	SHIM SET	35	BODY
15	PINION CAP	37	SHIM SET
16	O-RING, PINION CAP	47	O-RING, YOKE CAP
17	SHIM SET	50	O-RING, BODY
18	BEARING, LOWER PINION	60	SIGHT TUBE
22	YOKE CAP	61	PLUG
23	WEAR SLEEVE	62	SEAL, AMS
24	OIL SEAL	63	WEAR SLEEVE, AMS
26	DRIVE SLEEVE		

JENSEN AMS SEAL ITEM #62 INSTALLED	Jensen Mixers International, Inc. P.O. BOX 470368 TULSA, OKLAHOMA 74147							
GEARBOX SERIAL NUMBERS WILL END WITH LETTER D	SCALE: 14	DATE: 7/27/2017	BY: B	Y: B.A.				
	TITLE: PARTS LIST CROSS SECTION 650 GB							
	SHT. OF	DRAWING NO: S12AE REV 6 650 GB		REV.				
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Jensen Mechanical Actuator

Installation of The Drive unit

 Remove the mixer bearing cap and take the nameplate off. Remove and discard the nameplate and screws. Note that on unit with vertical pinch bolt on the bearing cap, the vertical bolts must be loosened

first.

- Fasten the drive hub to the thrust bearing assembly with the cap screws provided.
- Bolt the mixer bearing cap back on the gearbox.
- Bolt the mechanical actuator drive unit to the bearing cap



with the hex head screws and lock washers provided. Be sure that the two locating pins fit the two holes in the bearing cap, and the square on the drive assembly properly engages the square socket in the drive hub.

5. On mixers with vertical clamp bolts on the bearing cap, tighten these bolts securely.

The Actuator Unit

- Bolt the actuator unit and mounting bracket assembly <u>UNDER</u> the "L" shaped plate on the right side of the mixer flange with two ½ -13 NC by 2 inch long bolts and lock washers provided. Caution: the flexible drive shaft connecting the drive unit to the actuator unit must be free of all kinks and must not touch the ground.
- Bolt the mixer mount bracket onto the "eye" that is already welded on the mixer mount. Tighten the square head set screw.
- 3. Loosen the top bolt holding the actuator lever to the actuator unit. Raise lever to rotate.
- 4. Install the linkage rod assembly. Make sure the linkage rod assembly model number agrees with the mixer model number on the serial plate. Serious damage to the actuator would result if the numbers do not agree. Tighten the top bolt holding the actuator lever to the actuator unit. Tighten linkage rod nuts and install cotter pins.

Synchronization – Two or more mixers

If there are two mixers per tank, the mixers and actuators must be synchronized to operate together. To synchronize mixers on the tank, loosen the bolt on top of the actuator lever so that the serrations under lever skirt can be disengaged. Raise lever 1/8 inch and move the mixers until the arrows marked on the lever skirts are pointing to the same number on all actuator units. When this is accomplished, tighten all the bolts until the lever serrations are tight. All the mixers on the tank should now be aligned properly. (See Figure below)

Under normal operation, an individual will not be able to see the actuator and mixer move. After mixers are started, check in about an hour or more to see if the arrow marker has moved at least 1/2 mark on the actuator unit. The mixers should remain synchronized as long as all units start at the same time and run the same amount of time. Over time, it may be necessary to re-align the mixers; inspect mixer orientation quarterly.



LONG TERM STORAGE

Jensen recommends long term (more than 90 days) storage procedures to protect mixers from atmospheric corrosion, physical damage and other harmful effects. Proper storage is especially important in corrosive or high humidity environments. Store and maintain related equipment (motors, control panels and similar devices) supplied by Jensen according to manufacturers' instructions. Failure to store and protect Jensen mixers properly may void any warranty, expressed or implied.

Pre-storage Inspection

When mixers are delivered, check impellers, impeller shafts and gearbox for shipping damage. Report damage to carrier and Jensen Mixers. Protect, any carbon steel components from corrosion, and check protective shipping coatings. Renew if necessary. Use heavy grease with corrosion inhibitor or thick spray such as Holt Lloyd Corp. LPS-3. New gear drives do not require additional internal protective procedures if storage is less than 90 days.

Storage Preparation and Maintenance

Jensen recommends the customer store mixers mounted on factory-provided skids in original crating.

- 1. Store each drive unit in its operating position, then fill gearbox to proper level with recommended lubricant. Rotate coupling until drive output shaft makes two complete evolutions.
- 2. Connect motor heaters, if supplied to a proper power source.
- 3. On side-entering mixer drives without motors installed, cover coupling half with heavy plastic sheet or bag and secure with cord or adhesive tape. Cover motors and mixers with plastic or tarpaulins; secure.
- 4. Check at 30-day intervals. Rotate motor shafts and rotate couplings for three or more complete rotations of output shafts.
- 5. Store and maintain mixers according to location-specific instructions.

Storage Locations

Each type of storage location requires different procedures.

- Location 1 (preferred): a dry, enclosed, temperature and humidity controlled environment. Relative humidity of 40% or lower is ideal.
- Location 2 (acceptable): a dry, enclosed area such as a warehouse. Marginally acceptable is an open shed with concrete floor.
- Location 3 (not recommended): outdoors under waterproof covering or mounted in operating location.

Location-Specific Storage Instructions

Location I. Perform preparation and maintenance through step 4 above.

- Location 2. Cover motor completely but do not seal off to prevent accumulation of moisture. Cover gear drive securely. Extreme conditions may require use of portable dehumidifiers or placement of renewable desiccant bags under coverings.
- Location 3. Cover motor completely but do not seal off to prevent accumulation of moisture. Cover gear drive securely. Secure all coverings against wind and rain. Extreme conditions may require placement of renewable desiccant bags under coverings.

Preparation for Service after long term storage:

- 1. Remove all protective materials and coverings. Wipe off dirt and oil.
- 2. Check greased bearings; re-grease if necessary.
- 3. Pour 32oz. tank compatible lubrication fluid into air vent to pre-lubricate seal. Hand rotate mixer through three full prop revolutions.
- 4. If applicable: Drain 10 percent of storage lubricant volume to remove condensed moisture. Adjust lubricant level with proper lubricant. Putting mixers in service with contaminant-free storage lubricant is permissible.
- 5. Review mixer manual thoroughly and follow installation, start up and operating procedures.



How To Use This Manual

This manual provides detailed instructions on installation, annual maintenance and parts identification. Use the table of contents below to locate required information.

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CAREFULLY FOLLOW THE INSTRUCTIONS IN THIS MANUAL FOR OPTIMUM PERFORMANCE AND TROUBLE FREE SERVICE.

Introduction

This manual applies to standard Types WA10, 11 & 21 Torus couplings. Couplings can operate in either the horizontal or vertical position without modification. For limited end float and thrust applications, refer to Factory.

Installation

Standard mechanics tools, torque wrenches, a straight edge, scale and feeler gauges are required to install Falk Torus Couplings. Align shafts accurately and do not exceed the recommended installation maximum values specified in Table 1, Page 4, and illustrated in Figure 3. For best results, use a dial indicator to check final alignment and make certain fasteners are tightened to the required torque.

Clearance Fit Hubs — Coupling Sizes 1020 thru 1090 are generally furnished for CLEARANCE FIT with set screws. Prior to installation, clean all parts using a non-flammable solvent. Check hubs, shafts and keyways for burrs. Install keys, mount hubs with flange face flush with shaft ends (Figure 2) and tighten set screws. Proceed to Step 2, Page 2.

Interference Fit Hubs — Sizes 1100 and larger are furnished for an INTERFERENCE FIT without set screws. Heat hubs to a maximum 275°F (135°C) using an oven, torch, induction heater or an oil bath. To prevent seal damage, DO NOT heat hubs beyond a maximum temperature of 400°F (205°C). Mount hubs per Figure 2, so that the hub face is flush with shaft end, or extended, depending upon which assembly is required for the application.

WARNING: If an oil bath is used, the oil must have a flash point of 350°F (177°C) or higher. Do not rest hubs on the bottom of the container. Do not use an open flame in a combustible atmosphere or near combustible materials. When an oxy-acetylene or blow torch is used, use an excess acetylene mixture. Mark hubs near the center of their length in several places on hub body with a temperature sensitive crayon, 275°F (135°C) melt temperature. Direct flame towards hub bore using constant motion to avoid overheating an area. Type WA21

Figure 2

Figure 1 GAP AND BG GAP SIZES 1020-1070

BG

SIZES 1080-1160







Allow space between shaft ends for end float and misalignment. When shaft(s) extend into the gap, one unit must be moved before replacing the flexible.

Figure 3



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Installation and Maintenance • Falk Torus Couplings

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(Page 2 of 5) Types WA10, 11 & 21 • Sizes 20 thru 160 & 1020 thru 1160

Maximize Performance & Life

The performance and life of couplings depend largely upon how you install and maintain them. Before installing couplings, make certain that foundations of equipment to be connected meet manufacturers' requirements. Check for soft foot. The use of stainless steel shims is recommended. Measuring misalignment and positioning equipment within alignment tolerances is simplified with an alignment computer. These calculations can also be done graphically or mathematically. It is recommended that final alignment be checked using either an alignment computer or graphical analysis. Both methods allow the incorporation of "cold offsets", which will compensate for shaft position changes due to thermal growth.

WARNING: Consult applicable local and national safety codes for proper guarding of rotating members. Observe all safety rules when installing or servicing couplings, Lockout starting switch of prime mover before working on or installing couplings.



1 - Mount Hubs

Lock out starting switch of prime mover. Mount hubs as outlined on Page 1. Install and tighten set screws over key when furnished. When shaft(s) are extended thru the hub(s), assemble the element per Step 4 and then lightly bolt it to one hub. Move drives into position and then perform Steps 2, 3 and 5. Install bushings carefully per instructions furnished with the bushing,



2 — Gap & Angular Alignment

Align coupling within the angular limits and to the coupling GAP or BG dimension specified in Table 1. To determine angular misalignment in inches, measure the maximum space between flanges as shown above and the minimum space 180° away, and then subtract. Angular misalignment in inches equals maximum A minus minimum B as shown in Figure 3 on Page 1.



3 - Offset Alignment

Align shafts so that a straight edge rests squarely (or within the limits specified in Table 1) on both flanges as shown above and at 90° intervals. Check clearance with a feeler gauge. Tighten all foundation bolts and repeat Steps 2 and 3. Realign coupling if necessary.

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Falk Torus Couplings • Installation and Maintenance

Types WA10, 11 & 21 • Sizes 20 thru 160 & 1020 thru 1160 (Page 3 of 5)





SIZES 1100 THRU 1160

SIZES 1020 THRU 1090

4 — Assemble Flexible Element

For Sizes 1020 thru 1090 reach through the flexible element, grip the element lip and then twist it completely through the center of the element as if attempting to turn it inside out. Insert the flexible element into the clamp rings and release,

For Sizes 1100 thru 1160 assemble the flexible element halves (1 and 2) with the match marks aligned. Do not use tools with sharp corners or burrs. Lay clamp rings on a flat surface and insert end of 1 into rings and temporarily insert one fastener as shown. Force opposite end in and down until it seats in rings. Insert end of 2 and one fastener coat opposite end with liquid soap (NOT OIL), then insert tool in 2 and pry against end of 1 until element snaps into place. Remove fasteners.

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5 — Install Clamp Ring Assembly & Tighten Fasteners

For Sizes 1020 thru 1090 position the clamp ring assembly as shown, insert one fastener and pivot assembly into position. Insert ALL fasteners in both flanges, Tighten fasteners in two equal increments of torque to value specified in Table 1. Check concentricity of clamp ring outside diameter. True up while tightening fasteners if needed. Repeat specified torque until stabilized. Metal to metal contact between ring and hub face is required, check with a feeler gauge.

For Sizes 1100 thru 1160 position clamp ring assembly between hubs. Line up holes in hub, flex element and clamp ring by inserting a tapered bar in one hole and inserting a fastener in an adjacent hole. Insert ALL fasteners in both flanges and tighten fasteners in three increments of torque; 1/a, 3/a, and a specified value in Table 1. Tighten fasteners adjacent to element splits first and then, starting at splits alternately progress toward the center of the element. Repeat specified torque until stabilized. Metal to metal contact between ring and hub face is required, check with a feeler gauge.



Annual Maintenance

For extreme or unusual operating conditions, check coupling more frequently.

- Check alignment per Steps 2 and 3 on Page 2. If the maximum operating misalignment values are exceeded, realign the coupling to the recommended installation values. See Table 1 for installation and maximum operating misalignment values,
- 2. Check tightening torques of all clamp ring fasteners.
- Inspect flexible element to determine if replacement is required.

COUP	LING SIZE	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160
Allow, Speed rpm	WA 10	4500	4500	4500	4100	3600	3250	2850	2500	2200	2000	1800	1650	1500	1350	1250
	WA 11 & 21	5000	5000	5000	4500	4000	3600	3000	2800	2400	2200	2000	1850	1600	1500	1400
Fastener Tightening Torque Ib-in.†		96	.96	96	240	240	240	324	540	840	1200	1200	1200	1200	2400	2400
Coupling Gap ±.03 (Fig. 1)‡		1.03	1.06	1.12	1.38	1,50	1.62	1.75	2.12	2.50	3.00	3.56	4.00	4.62	5.00	5.75
BG ±.0	3 (Fig. 1)‡	Ê.e.e.	Pees.	EEF.	544		iter.	1.98	2.39	2.80	3.39	4.05	4.55	5.25	5,79	6.62
Recommended Installation Maximum Values	Offset	.014	.014	.014	.014	,020	.020	.020	.020	.031	.031	.031	.042	.042	,042	.642
	Angular A minus 8	.020	.020	.020	.020	,042	,042	.042	.042	.062	,062	.062	.080	.080	.060	.080
Max Operating Misalignment Values	Offset	.020	.020	.020	.020	.031	.031	.031	.031	.047	.047	.047	,062	:062	.062	.062
	Angular A minus 8	.030	.030	.030	.030	.062	.062	.062	.062	.094	.094	.094	.120	:120	,120	.120

TABLE 1 — Installation and Alignment Data — Dimensions Inches *

*Refer to Selection Guide for maximum bores. For reboring instructions, refer to Engineering Manual 427-108.

+For non-lubricated threads.

#Refer to Factory for Gap and BG settings for limited end float applications.

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