/

ECCENTRIC PLUG VALVE O & M MANUAL

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Instructions to Rotate Gear Box

1. Completely close the valve against the closed stop.

2. Back off operating nut (1) turn to relieve closing torque on internal of gear.

3. On worm gear with position indicators remove (2) ¼" capscrews holding indicator plate and remove plate.
   On worm gear with buried service cap (on top of gear) remove (3) ¼" capscrews retaining the cap and remove the cap.

4. Loosen and remove the ½" capscrew, lockwasher, and large flat washer under the indicator plate (or cap on buried service).

5. Loosen and remove the (4) 3/8" capscrews retaining the worm gear to the flanged adapter plate which is bolted to the valve cover. (Do not remove the flanged adapter plate from the valve cover).

6. Lift worm gear off of flange adapter and rotate to the desired position.

7. Reassemble in reverse order.

8. Operate valve and check for correct closure. Re-adjust closed stop if necessary. (Refer to stop adjustment procedures.)

INSTALLATION, OPERATION & INSPECTION MANUAL

ECCENTRIC PLUG VALVES

INSTALLATION, OPERATION & INSPECTION MANUAL

ECCENTRIC PLUG VALVES

Installation, Operation and Inspection Manual

ECCENTRIC PLUG VALVES

General;

Inspect all valves and actuators at time of delivery for shipping damage and confirm compliance with specifications. Valves are fully tested per the AWWA C517 standard and properly packaged by the manufacturer. The valves should be stored in such manner to protect them from the weather. Water and debris should not be allowed to collect in or on the valve. Valve should be stored with plug partly open. Flange protectors and other packaging materials removed for inspections should be replaced. Proper slinging and handling methods should be used when moving the valves. Do not place slings or other devices around operating shaft, or through the flow way. Do not use attached actuators for lifting.

I. INSTALLATION

1. *Check that valve and end joints are clean. Again check for damage to the valve. Open and close valve to insure proper operation. Close valve plug before placing in trench.*

2. *Handle valve carefully. Do not drop into position. Do not use attached actuators or other mechanisms as lifting devices. Do not place slings or chains through port opening.*

3. *Prepare pipe ends according to pipe manufacturer's instructions. Install valve per proper method according to end joint type. All piping should be properly supported to avoid line stress on the valve. Do not use the valves as a jack to force a pipeline into position.*

4. *Valves should be positioned for orientation of flow and any attached actuators. The valve is designed to operate with flow in two directions. The valve is normally used in the "standard flow" direction (seat on downstream of flow), with flow against the back of the plug.*
   In buried installation, any valve boxes should be installed such that no load is transferred to to the valve.
   Provisions should be made to prevent dirt and debris from entering valve box and getting on top of the valve which could impair the operation of the valve.

5. *In buried installations, do not backfill before the system is tested. Leave valves exposed while the pipeline is being pressurized.*

6. *Do not test systems to greater than valve's rated working pressure.*

7. *With the valve in the open position, the entire system should be thoroughly flushed to prevent the valve closing on debris and damaging the seat.*

II. OPERATION

1. *Do not operate valves in systems that exceed the rated working pressure of the valve. (3"-12" 175 psi, 14": - 24" 150 psi)*

2. *System should be completely flushed before valve is actuated in normal cycle.*

3. *The Eccentric Plug Valve opens and closed through 90 degree of travel. The manual actuator has mechanical stops for fully open or closed position. Excessive force will improve seating or closing but could damage the actuator or the seat (if debris in line is holding plug open). The Eccentric plug valve closes by rotating the rubber covered plug into the seat. On non-geared valves this is done with a quarter turn of the operating nut. On geared valves the number of turns are 4"-12", 10 turns; 14", 16 turns; 16"-20", 29 turns; 24" , 90 turns. All valves open left (counter-clockwise).* ***Note; for valves with electric actuators, see actuator O&M.***

4. *If the actuator has become difficult to operate before completing the necessary number of turns (based on valve and actuator sizes) do not force. Open the valve fully and start over. The flow in the valve may flush obstructions from the seat area. If the plug is forced into the seat, damage to seats or actuator may result.*

5. *Frequency of operation should be based on the media being conveyed. Systems With higher solids contents should be exercised on a regular basis, suggested weekly.*

III. MAINTENANCE

1. *Semi annual inspections are minimum recommended. Valves should not be dis-assembled unless a break down has occurred.*

2. *The eccentric plug valve and actuator should not be opened, disassembled, or adjusted unless a breakdown in normal operation occurs.*

3. *Inspections should include checking gasketed joints for leakage.*

4. *During regular inspection, the valve should be opened and closed with pressure in the pipeline. The valve should function freely without vibration.*

5. *With the valve closed and pressure against the plug, a check for leakage is possible by "listening" to the valve for flow. A stethoscope will help in this procedure.*

6. *.Attached actuators should be inspected per manufacturer's recommendations provided with those units.*

7. *A permanent record of the period inspections should be maintained for each valve.*

There are no lubrication requirements. (Unless disassembling)

Recommended Installation Position

Horizontal Installation with Liquids Containing Suspended Solids;
The valve plug shaft should be in the horizontal plane with the plug rotating towards the top of the valve body.

Vertical Installation with Liquids Containing Suspended Solids;
The valve should be installed with the seat end on the top side, regardless of the flow direction, with the plug rotating to the top of the valve.

Disassembly of 3" through 8" Eccentric Plug (1/4 turn)

Refer to 3" through 12" Parts List

Note; Line pressure must be 0 psi and the line drained if possible.

1. Put the valve in the full open position.
2. Remove #17 locknut.
3. Remove #15 bellvue spring washers.
4. Remove #14 operating nut.
5. Loosen and remove (2) follower nuts (item 11).
6. Remove gland/brake follower (item 9). This will relieve the sealing pressure on the V-Packing (item 13).
7. Loosen and remove the cover capscrews (item 8). Mark the position of the cover to body with a scribe or other markers.
8. Using (2) pry bars, one on each side of the cover (item 2) break the cover loose from the body (item 1). Remove the cover by sliding straight up over end of shaft.

*** NOTE; A suitable lubricant should be applied to the plug shaft to allow the packing to slide smoothly and prevent damage.**

9. The plug (item 3) can now be removed by turning and lifting out of the body.
10. Inspect top (item 4) and bottom bearings (item 5) for damage and replace if necessary.
11. Clean and inspect the nickel seating surface in the body (item 1). If seating surface is damaged, body should be replaced.
12. Inspect plug (item 3) sealing surface for nicks and wear. Replace if necessary.
13. Insert plug (item 3) into body (item 1) and orient in the open position.
14. Slide nylatron thrust washer (item 6) onto shaft of plug.
15. Inspect cover oring (item 7), and place in recess of body.
16. Remove old v-packing (item 13) form (item 2) recess.
17. Slide cover onto plug shaft. Align cover with scribe mark.
18. Install cover capscrews and tighten.
19. Slide packing set (item 13) over plug shaft and into packing recess in cover. The follower gland (item 9) can be used to drive the packing into the cover.
20. Install brake #12 onto top of packing. Tapered end of brake should point up.
21. Install gland/brake follower.
22. Install follower nuts and tighten to seal packing.
23. Replace operating nut #14 with #16 adjusting stud installed in top of plug.
24. Replace bellvue spring washers #15 and lock nut#17.

*** Mystic FG-2 food grade grease or equivalent.**

DISASSEMBLY OF 4" THROUGH 12" ECCENTRIC PLUG VALVES (With Actuators)

(Refer to 3"-12" Eccentric Plug Valve Parts List)
Note; Line pressure must be 0 psi and the line drained if possible.

1. Put the valve in the full open position.

2. Remove capscrews securing the actuator (worm gear, motor operator, cylinder actuator, etc.), then lift off the actuator.
   Retain keys, couplings etc., for reassembly of the actuator.

3. Loosen and remove (2) follower nuts (item 11).

4. Remove gland/brake follower (item 9). This will relieve the sealing pressure on the V-Packing (item 13).

5. Loosen and remove the cover capscrews (item 8). Mark the position of the cover to body with a scribe or other markers.

6. Using (2) pry bars, one on each side of the cover (item 2) break the cover loose from the body (item 1). Remove the cover by sliding straight up over end of shaft.

***NOTE; A suitable lubricant should be applied to the plug shaft to allow the packing to slide smoothly and prevent damage. (*Mystic FG-2 Food Grade Grease or equivalent)**

7. The plug (item 3) can now be removed by turning and lifting out of the body.

8. Inspect top (item 4) and bottom bearings (item 5) for damage and replace if necessary.

9. Clean and inspect the nickel seating surface in the body (item 1). If seating surface is damaged, body should be replaced.

10. Inspect plug (item 3) sealing surface for nicks and wear. Replace if necessary.

11. Insert plug (item 3) into body (item 1) and orient in the open position.

12. Slide nylatron thrust washer (item 6) onto shaft of plug.

13. Inspect cover oring (item 7), and place in recess of body.

14. Remove old v-packing (item 13) from cover (item 2) recess.

15. Slide cover onto plug shaft. Align cover with scribe mark.

16. Install cover capscrews and tighten.

17. Slide packing set (item 13) over plug shaft and into packing recess in cover. The follower gland (item 9) can be used to drive the packing into the cover.
18. Install follower nuts and tighten to seal packing.
19. Actuator can be reinstalled.

DISASSEMBLY OF 14" THROUGH 24" ECCENTRIC PLUG VALVES
(With Actuators)

(Refer to 14"-24" Eccentric Plug Valve Parts List)

Note; Line pressure must be 0 psi and the line drained if possible.

1. Put the valve in the full open position.

2. Remove capscrews securing the actuator (worm gear, motor operator, cylinder actuator, etc.) then lift off actuator. Retain keys, coupling etc., for reassembly of the actuator.

3. Loosen and remove (2) follower nuts (item 1).

4. Remove gland follower (item 2). This will relieve the sealing pressure on the v-packing (item 3).

5. Loosen and remove the cover capscrews (item 6). Mark the position of the cover to body with a scribe or other markers.

6. Using (2) pry bars, one on each side of the cover (item 5) break the cover loose from the body (item 10). Remove the cover by sliding straight up over end of shaft.

Note; A suitable lubricant should be applied to the plug shaft to allow the packing to slide smoothly and prevent damage.

7. The plug (item 9) can now be removed by turning and lifting ouf of the body.

8. Inspect top (item 4) and bottom bearings (item 11) for damage and replace if necessary.

9. Clean and inspect the nickel seating surface in the body (item 10). If seating surface is damaged, body should be replaced.

10. Inspect plug (item) sealing surface for nicks and wear. Replace if necessary.

11. Insert plug (item 9) into body (item 10) and orient in the open position.

12. Slide nylatron thrust washer (item 7) onto shaft of plug.

13. Inspect cover o-ring (item 8), and place in recess of body.

14. Remove old v-packing (item 3) from cover (item 5) recess.

15. Slide cover onto plug shaft. Align cover with scribe mark.

16. Install cover capscrews and tighten.

17. Inspect packing set (item 3) over plug shaft and into packing recess in cover. The follower gland (item 2) can be used to drive the packing into cover.

18. Install follower nuts and tighten to seal packing.

19. Actuator can be reinstalled.

Instructions to Rotate Gear Box on 4" through 12"

1. Completely close the valve against the closed stop.

2. Back off operating nut (1) turn to relieve closing torque on internal of gear.

3. On worm gear with position indicators remove (2) ¼" capscrews holding indicator plate and remove plate.
   On worm gear with buried service cap (on top of gear) remove (3) ¼" capscrews retaining the cap and remove the cap.

4. Loosen and remove the ½" capscrew, lockwasher, and large flat washer under the indicator plate (or cap on buried service).

5. Loosen and remove the (4) 3/8" capscrews retaining the worm gear to the flanged adapter plate which is bolted to the valve cover. (Do not remove the flanged adapter plate from the valve cover).

6. Lift worm gear off of flange adapter and remove from plug shaft.
   Rotate to the desired position and slide backover plug shaft.

7. Reassemble in reverse order.

8. Operate valve and check for correct closure. Re-adjust closed stop if necessary. (Refer to stop adjustment procedures, see troubleshooting)

TROUBLESHOOTING
ECCENTRIC PLUG VALVES

POSSIBLE MALFUNCTION	SYMPTOMS / CAUSES	CORRECTIVE ACTION
Joint Leak	Loose Bolts	Tighten Bolts
Shaft Leak	Loose Gland	Tighten Gland
	Packing Worn	Tighten packing gland/ replace packing.
Seat Leak	Debris on seat.	Flush valve to clean seats.
	Damaged Seat	Inspect-replace plug
	If none of the above	*Adjust Closed position stops.
Hard to Operate (1/4 turn valve)	Gland Brake/ Follower Too tight	**Loosen follower /Plate

***Inspection for the above should be done semi annually at a minimum.*

***Instructions for adjusting stops;**

For quarter-turn op nut/lever operated valves;

1. Loosen #19 jam nut. Back off #18 (square head capscrew) appropriately.
2. Close valve. Repeat if necessary until valve seals.

For worm gear operated valves;

Note; Close stop adjustment bolt is located closest to input shaft of worm gear.

1. Loosen #13 (lock nut). Back off #6 (stop screw) ½ turn at a time. Close valve. Repeat as need to attain seal.

ECCENTRIC PLUG VALVE
Troubleshooting (continued)

**Instructions for loosening Gland/Brake Follower;
(for quarter turn op nut/lever operated valves)

1. Loosen (#11) follower nuts. (2) on top of gland, #9. Adjust follower nuts (2) #11 on bottom of gland (#9) up to raise the gland.

2. Operate the valve several times to relax the packing (#13) and brake (#12). Note; Addition of a penetrating oil or lubricant to the packing area may aid in freeing up the operation.

3. Repeat adjustments as necessary.

4. When valve operates freely, tighten the top (2) follower nuts, #11, down tight against the gland/brake follower, #9. Make sure gland/brake follower is level and not binding the brake/packing when operated.

For Parts and Service Contact Mfg's Rep;

INSTALLATION, OPERATION & MAINTENANCE MANUAL
ECCENTRIC PLUG VALVES

O & M Manual

Gardiner, Maine
Wastewater Treatment Facility Up Grade

O & M Contents

Note; Each Section Has it's Own Table of Contents

ECCENTRIC PLUG VALVE
INSTALLATION, OPERATION & MAINTENANCE MANUAL

ECCENTRIC PLUG VALVE
INSTALLATION, OPERATION & MAINTENANCE MANUAL

O & M Manual

Project; **Orange County Sanitation District**

Job No P2-91 Plant No. 2 Primary Sludge Feed System
&
Job No. P2-80 Primary Treatment Rehabilitation and Refurbishment

Huntington Beach , CA

For: **Eccentric Plug Valves**
F5412 3" Flg Lever Operated
F5412 4",6",8",10",12" Manual Act/Handwheel & Indicator
Moniteur AMYB-1120 Limit Switch
Morin Cylinder Operators:
F5412 6" & 10" with Morin S **(P2-91)** Double Acting Cyl. Actuators
F5412 4" & 6" with Morin B **(P2-80)** Double Actting Cyl. Actuators

Specification; 15110 Plug Valves
15101 Cylinder Operators

Manufacturer; Clow Valve Company
902 S 2nd Street
Oskaloosa, IA 52577
641-673-8611
S/O 113875 (P2-80)
S/O 114164 (P2-91)

Contractor; Shimmick Construction
22212 Brookhurst Street
Huntington Beach CA 92646
714-845-3280
SCCI/CLOW 002

Supplier; Inplant Sales
Po Box 1120, 190 Bissell Place, Unit D
Parts & Service San Jancinto, CA 92582
951-654-1873 Fax 951-654-2484

Instructions to Add Worm Gear to ¼ Turn Valve

1. Remove #17 lock nut.
2. Remove #15 bellvue washers.
3. Remove #14 op nut.
4. Remove #16 stud.
5. Remove #11 follower nuts (all 4).
6. Remove #9 gland brake follower.
7. Remove 12 brake.
8. Add new follower and (2) 3/8" nuts.
9. Tighten gland onto packing, do not over tighten.
10. Add gear adapter to cover.
11. Add worm gear to adapter. Tighten bolts.
12. Put 5/8" washer in top of worm gear.
13. Tighten ½ x 1 ¼" capscrews into top of lug shaft to pull plug up "snug".
14. Put on indicator plate and tighten (2) screws.
    Buried Service-Put on buried service cover and tighten (3) screws.
15. Put on handwheel and pin or op nut & pin.
16. Close valve and set closed stop (closest to input shaft).
17. Open and close valve, check for operation

INSTRUCTIONS TO REPLACE WORM GEAR

1) Remove (3) capscrews on cap in center of operator cover.

2) Remove cap.

3) Remove ½" x 1 ¼" capscrew under cap. And 5/8' x 2 1/8" dia flat washer.

4) Remove (4) capscrews holding actuator onto the flanged adapter.

5) Remove defective actuator and replace with new actuatort.

6) Replace and tighten mounting capscrews.

7) Replace flat washer & ½" x 1 ¼" capscrew – tighten.

8) Replace cap and (3) capscrews on top of actuator cover.

9) Close valve and adjust stops as necessary to achieve seal.
(Refer to " Instructions for adjusting stops").

INSTRUCTIONS TO CHANGE ABOVE GROUND WORM GEAR TO BURIED SERVICE GEAR

1. Remove (2) capscrews on indicator in center of operator cover.
2. Remove indicator.
3. Remove ½" x 1 ¼" capscrew under indicator and 5/8" x 2 1/8" dia flat washer.
4. Remove (4) capscrews holding actuator onto flanged adapter.
5. Remover worm gear.
6. Remove (4) capscrews holding flanged adapter to cover.
7. Remove above ground flanged adapter (with /access openings) & replace with buried service flanged adapter (no access openings).
8. Replace and tighten (4) capscrews in flanged adapter and cover.
9. Replace worm gear
10. Replace & tighten (4) capscrews between flange adapter and worm gear.
11. Replace flat washer and ½ x 1 ¼" capscrew in center or worm gear. Tighten.
12. Install new buried service cap to center of worm gear and secure with (3) capscrews.
13. Change handwheel to op nut.
14. Clow valve and adjust stops as necessary to achieve seal.
    (refer to "instructions for adjusting stops)

Recommended Spare Parts

Det#	Size	Description	Part #	List Price
3	6”	Plug	M0700965	$ 139.86
7	6”	Cover Oring	T2400712	.88
13	6’	Packing	T2401072	12.65
3	8”	Plug	M0701064	269.40
7	8”	Cover Oring	T2400936	3.63
13	8”	Packing	T2401072	12.65
3	10”	Plug	M0701065	300.44
7	10”	Cover Oring	T2401077	4.75
13	10”	Packing	T2401078	16.60
3	12”	Plug	M0701066	424.40
7	12”	Cover Oring	T2401079	6.60
13	12”	Packing	T2401078	16.60

INSTRUCTION MANUAL

I
Maintenance & Installation Instructions for KE Gearbox

II
Worm Gear Maintenance

Maintenance & Installation Instructions for KE Gearbox

1. Introduction

Scope of Manual - This instruction manual includes installation, adjustment, operation, maintenance, and parts ordering information for the KE manual gear actuator supplied on Clow Eccentric Plug Valves.

2. Description

The KE manual gar actuator is for use with butterfly, ball and eccentric plug valves or any other 90 degree device. In the actuator, torque is transmitted from the handwheel through the handwheel in put shaft to a worm and drive sleeve gear sector. The worm and drive sleeve gear multiply the torque and transmit it to the valve shaft. The size 10-KE:6 actuator additionally has a spur gear reduction drive for increased torque capability.

3. Installation

The KE manual gear actuator is normally shipped mounted on a valve body. If the actuator has been shipped separately for installation on a valve body, or if the actuator was removed for maintenance, mount the actuator by following the instructions presented in this section **before installing the valve body in the pipeline.**

Rotate the valve plug to the closed position.

Rotate the handwheel to move the drive sleeve gear to the position that is to correspond to the closed position of the valve disk/plug as follows; Turn the handwheel or op nut so that that the drive sleeve gear and travel indicator are rotated fully clockwise.

Remove the travel indicator pointer by removing the machine screws.

Making certain that alignment is correct, slide the actuator onto the valve shaft in the desired mounting position. Check to be sure the valve shaft is still aligned with the proper gear hub keyway, square or flats.

Check the alignment of the mounting holes with those in the valve body. If the holed are not aligned, rotate the handwheel to allow for repositioning. It may necessary to loosen the hex nuts and back out the travel stop screws to allow this repositioning.

When hole alignment is correct, secure the actuator to the valve body with capscrews.

Making certain that the travel indicator pointer is aligned as it was before assembly, install the travel indicator.

Before installing the valve body and actuator in the pipeline, do the procedures presented in the **adjustment** section of this manual.

4. Adjustment

Do the following steps to adjust the travel stops. Travel stops consist of two set screws and two hex locking nuts.

Loosen the hex nuts and back out both setscrews.

Rotate the handwheel to move the valve plug to ghe fully closed position.

With the valve plug closed, rotate the set screw that is to limit valve closing until this set screw just hits the drive sleeve gear. Lock the set screw with the hex nut.

Rotate the handwheel until the open position is shown by the pointer tip on the travel indicator dial. Rotate the remaining travel stop set screw until it just hits the drive sleeve gear. Lock the set screw with the hex nut.

Install the valve body and actuator in the pipeline by following the instructions in the separate valve body instruction manual; then go to operation section.

5. Operation

After the travel stops have been adjusted and the control valve assembly installed, the actuator is ready for operation.

Caution

Do not use wrenches or other devices on the handwheel or handwheel shaft to increase operating force.

If the force required to rotate the handwheel is excessive, check for the following conditions:

A. Insufficient lubrication.

B. Seized actuator parts due to misalignment

C. Excessive pressure drop across the valve body, or ball rotation.

D. Obstruction to the valve body plug rotation.

Instructions are given the **Maintenance** section for lubrication and replacement of actuator parts.

If the actuator does not seem to control the process fluid, worm or drive sleeve gear teeth may be broken, the pin may be sheared, or internal valve body parts may be broken.

Maintenance Warning

Avoid personal injury or property damage from sudden release of pressure or uncontrolled process fluid. Before starting disassembly;

A. Isolate the valve from the process, and

B. Release all process pressure.

6. Lubrication

The interior parts should be lubricated whenever difficulty in handwheel rotation shows a need for lubrication.

To lubricate the actuator, do the following steps:

6.1 Note the location of the travel indicator pointer in relation to the indicator dial. Remove the machine screws and the travel indicator pointer. When reassembling the actuator, the travel indicator pointer must be returned to its original position.
6.2 Remove the capscrews which secure the gearbox cover plate and remove the gearbox cover plates.
6.3 Coat the worm, the drive sleeve gear teeth, and the bearing surfaces of the gearbox housing and worm with a quality gear lubricant. Too much is better than too little.
6.4 Install the covert on the gearbox and secure it with the capscrews.
6.5 Attach the travel indicator pointer so that it shows the same point of rotation as was noted before the pointer was removed. Secure the pointer with the machine screws.

7. Diassembly

Parts are subject to normal wear and must be inspected periodically. The following procedure describes actuator disassembly for general inspection and replacement of the drive sleeve gear.

NOTE

In some models to remove the drive sleeve gear, it is necessary to first remove the actuator input shaft and worm.

7.1 Remove the pin and the handwheel or op nut.

7.2 For a size 10KE:6 actuator only, remove the capscrews which secure the reduction drive and slide the reduction drive off the input shaft.

7.3 Note the location of the travel indicator pointer in relation to the indicator dial. **When reassembling the actuator, the travel indicator pointer must be returned to its original position.** Remove the machine screws and the travel indicator point.

7.4 Remove the capscrews which secure the gearbox cover plate and remove the gearbox cover plate.

7.5 Remove the pin that secures the worm to the input shaft by following the appropriate procedure for the actuator size:

7.5.1. For a size 2KE actuator, drive the pin into the shaft (the pin length is less that than the shaft diameter). Remove the pin out of the shaft.

7.5.2. For a size 6KE actuator, rotate the input shaft so that the pin may be driven through the cup plug (item not shown) on the back side of the gearbox housing.

7.5.3. For a size 5KE, 7KE, 9KE, or 10KE:6 actuator, there is sufficient clearance in the gearbox housing to drive the pin or pins through the shaft. Rotate the input shaft so that the pin will emerge on the drive sleeve gear side of the shat and carefully drive the pin out of the shaft,

7.6 Remove the input shaft and push the worm away from the drive sleeve gear.

7.7 Carefully noting the position of the drive sleeve gear hub, remove the drive sleeve gear.

7.8 Remove the worm gear along with any shims or thrust bearings where used.

7.9 Inspect all parts for excessive wear.

8. Assembly

NOTE

Before or during assembly, coat each of the following surfaces with a quality gear lubricant;

A. The teeth of the worm and the drive sleeve gear.

B. The gearing surfaces of the gearbox housing, worm and input shaft, and

C. Fill the housing at least one-third with lubricant.

14.1. Install the worm and any shims and thrust bearings into the gearbox casting. Keep the worm at the maximum distance from the installed position of the drive sleeve gear.
14.2. Install the drive sleeve gear onto the valve shaft. Be sure that the parts are aligned as they were before disassembling.
14.3. Noting the position of the pin holes and the original position of all shims and thrust bearings, install the actuator input shaft into the bore of the worm.
14.4. Make sure that the pin holes are aligned and install the worm pin. Be certain that the pin does not protrude from either side of the worm and interfere with the teeth on the drive sleeve gear.
    14.4.1. For a size 6KE actuator only, install the cup plug on the back side of the gearbox housing.
14.5. Install the gearbox cover plate.
14.6. Install the travel indicator making certain that the pointer shows the same degree of rotation as was noted prior to disassembly.
14.7. For 10KE:6 actuator only, install the reduction drive onto the input shaft and secure with capscrews.
14.8. Install the handwheel using a punch to align the holes from the opposite side while driving in the pin.
14.9. If necessary, adjust the actuator by following the instructions given in the adjustment procedure of this m manual.

II
WORM GEAR MAINTENANCE

Periodic maintenance of Kenneth Elliott worm gear actuators is normally not necessary, but for those customers having such programs, the following procedures would not be detrimental.

1. Procedure

1.1, Remove indicator plate.

1.2. Remove actuator lid, (being careful not to get foreign material into unit).

Add number 2-EP grease to gear case around sector, worm and bearings as necessary.

Be certain mating surfaces between lid and housing are clean.

Apply a thick film of grease or gasket sealer to housing.

Apply a thick film of 2-EP grease around sector gear (drive sleeve) bearing where the lid bore fits.

Carefully slip lid down over drive sleeve (rotate back and forth slightly so as not to damage “o” ring).

Replace lid bolts and tighten.

Grease top of sector hub where indicator plate mounts.

Put indicator in place and tighten bolts.

Repaint exposed areas of unit if necessary.

INSTALLATION , OPERATION & INSPECTION MANUAL

ECCENTRIC PLUG VALVES

Installation, Operation & Inspection Manual

Eccentric Plug Valves

RECOMMENDED SPARE PARTS FOR OWNER'S INVENTORY
(ONE SET PER VALVE SIZE)

Part No.	Description	Unit	Quantity	Unit Cost
T2400711	Cover Oring	4"	1	6.20
M0701063	Plug	4"	1	104.68
T2401080	Packing	4"	1	8.00
T2400712	Cover Oring	6"	1	7.25
M0700965	Plug	6"	1	115.00
T2401072	Packing	6"	1	10.00
T2401077	Cover Oring	10"	1	8.35
M0701065	Plug	10"	1	193.35
T2401078	Packing	10"	1	12.00
T2401079	Cover Oring	12"	1	13.25
M0701066	Plug	12"	1	216.20
T2401078	Packing	12"	1	12.00

RECOMMENDED SPARE PARTS FOR OWNER'S INVENTORY
(ONE SET PER VALVE SIZE)

Part No.	Description	Unit	Quantity	Unit Cost
T2400711	Cover Oring	4"	1	9.20
M0701063	Plug	4"	1	109.68
T2401080	Packing	4"	1	12.00

Refer to page 5 (Parts List) of Eccentric Plug O&M Section Three

EMPORIA LIFT STATION NO. 8
O&M Manual

Equipment Function, Normal Operating Characteristics and Limiting Conditions

Equipment Function;

To regulate and/or shut off flow in piping system.

Normal Operating Charateristics;

The valve opens and closes upon turning the handwheel.

Limiting Conditions;

Maximum line pressure 175 psi standard flow and 75 psi bidirectional.
Consult factory for questionable conditions.

Predicted Parts Life;

All parts have one year warranty. Parts life would be determined by service conditions, media and usage.
Note; By "Proof of Design" testing the valve has been cycled 10,000 times with minimal wear.

INSTRUCTIONS TO CONVERT WORM GEAR OPERATED VALVE TO 1/4 TURN

1) Remove (3) capscrews on cap in center of operating cover.
2) Remove cap.
3) Remove ½" x 1 ¼" capscrew under cap, and 5/8" x 2 1/8" dia flat washer.
4) Remove (4) 3/8" capscrews attaching flange adapter to cover of valve.
5) Remove actuator and flange adapter.
6) Remove (2) 3/8" nuts (#11) on gland follower (#9) and remove follower. Replace (2) 3/8" nuts back onto studs (#10).
7) Install brake (#12) over plug shafat with taper facing up. Push down until it contacts the packing.
8) Take new gland/brake follower (#9). Insert socket head capscrew (#20) into slot on follower (#9). Secure washer(#21) and jam nut (#22). (This is memory stop).
Thread 5/16" nut (#18) onto setscrew (#19) then thread into topped hole in follower (#9). (this is closed position stop).
9). Install new gland / brake follower (#9) assembly over plug shaft and onto studs (#10). Install (2) new 3/8" nuts (#11) on studs. Adjust lower 3/8" nuts (previously installed) until light friction is felt between brake (#12) and gland/brake follower (#9). Tighten top (2) 3/8" ntus to lock gland/follower in place.
10). Thread adjusting stud (#16) (1/2"x4") into top of plug shaft.
11). Slide operating nut (#14) over plug shaft. (refer to assembly drawing for orientation).
12) Install (5) bellvue spring washers (#15) over stud in center of operating nut (#14). (washers are staked (1) concave down against operating nut, next convex to convex side, alternate rest of washers.
13). Thread ½ " lock nut (#17) onto stud, tighten until washers are slightly compressed.
14) Operate valve and adjust closed stop-memory stop –memory stop and brake re-adjustment as necessary.