

KEYSTONE

VALVE USA, INC.

500-SERIES MANUAL GEAR OPERATORS INSTALLATION AND MAINTENANCE MANUAL

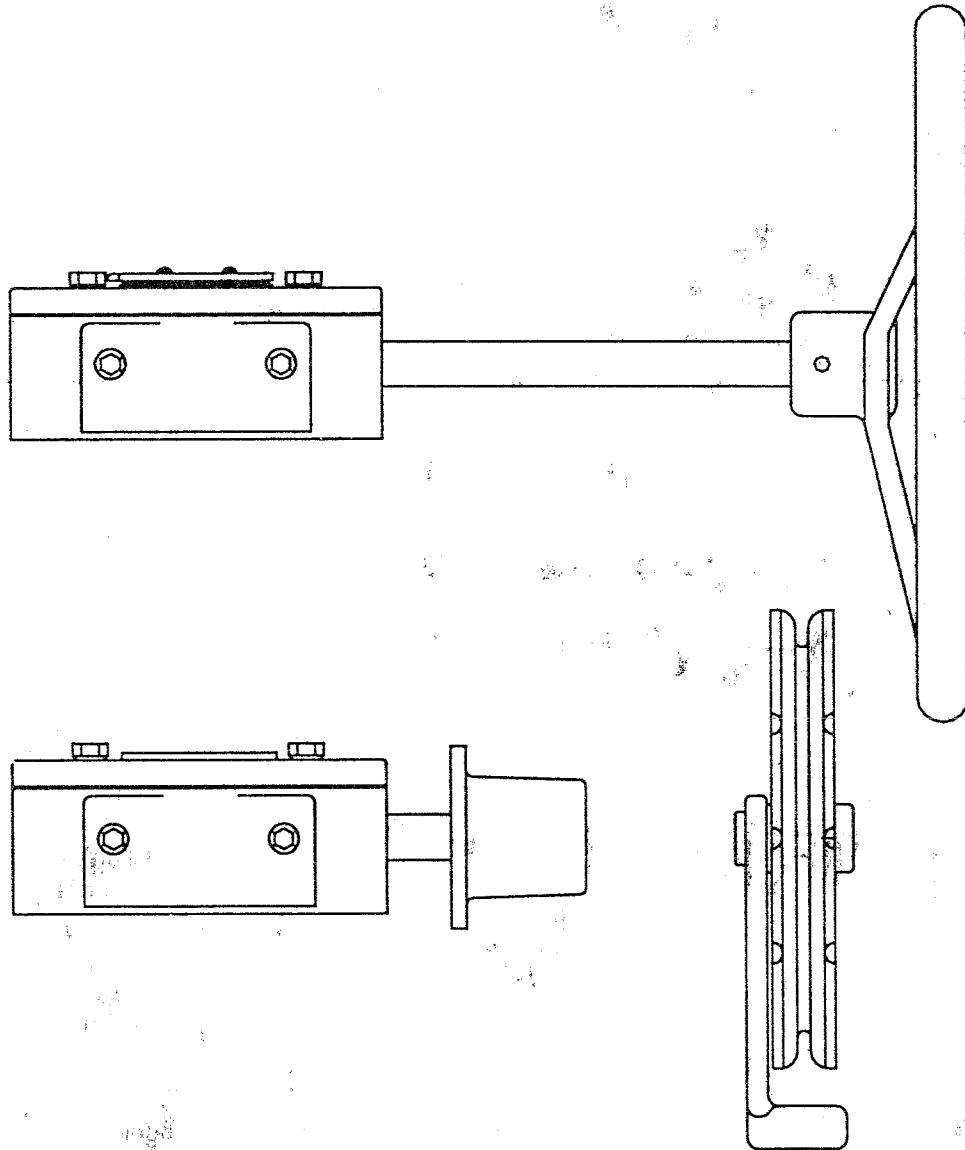


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MANUAL GEAR OPERATORS
INSTALLATION AND MAINTENANCE MANUAL

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MANUAL GEAR OPERATORS

STORAGE REQUIREMENTS:

The gear unit should be stored on a pallet or "skid" in a clean dry warehouse with the bottom of the actuator (input bore side) facing down. If this is not possible, the following applies:

1. Actuators must be kept off the ground and high enough to avoid standing water.
2. For prolonged storage outdoors, cover the unit with a water repellant cover (not supplied by Keystone).
3. If the actuator has been stored for a prolonged period, do the following prior to putting the unit in service:
 - a) Remove the actuator top cover and insure that the worm and segment gears are immersed in grease. If additional grease is required, refer to "LUBRICATION."
 - b) Do not mix lubricants of different soaps or bases. This may cause the lubricant to solidify.

SERVICE LOCATIONS:

For service or technical information, contact your factory representative:

Keystone Valve U.S.A., Inc.
P.O. Box 40010, Houston TX 77240
Phone: (713) 466-1176
Fax: (713) 937-5402
Telex: 166-038/755-265

INSTALLATION INSTRUCTIONS

1. Install the valve into a vise.
2. Fully close the valve.
3. Turn the gear operator to the full closed position by turning the handwheel or input shaft fully clockwise.

4. Place the gear operator on the valve by aligning the key on the valve stem with the appropriate keyway in the operator output drive. Slowly lower the operator down onto the valve shaft until the operator sits flush on the valve top plate.
5. If the four (4) mounting holes in the actuator bottom are aligned with those in the valve top plate, insert the mounting bolts and tighten to 5 in-lbs of torque. If the mounting holes will not align, attempt to turn the gear unit slightly in the desired direction until the holes are aligned. Finally, you can turn the input shaft slightly to shift the gear unit until its mounting holes align with those of the valve top plate.
6. Adjust the gear unit travel stops as follows:

NOTE: Ballcentric valves only; do not attempt to rotate the plug a full 90° if not required. The point of closure will vary according to design. Forcing the plug to travel the full 90°, when not required, results in high torque and premature wear on the plug facing.

- a) Loosen the two (2) travel stop screws (see Illus. 1A or 1B).
 - 1) Note: The locking screws must be removed to adjust the travel stops. For buried service gears, the seal plug must also be removed.
- b) First determine if the valve has an internal stop (Example: KLOK).
 - 1) If the valve **does not** have an internal stop, proceed as follows:

With the valve disc in the fully "closed" position and the gear operator top plate indicator pointing to closed, tighten the closed (right) travel stop until it comes in contact with the segment gear (see Illus 1A or 1B). Back-off the travel stop 1/4 turn.
 - 2) If the valve **does have** an internal stop, proceed as follows:

Make sure that the disc is fully closed by turning the handwheel clockwise until it stops against the cast-in disc stop. Turn the "**CLOSED**" travel stop first. Turn the travel stop clockwise until it stops. **NOTE:** Do not over-tighten the travel stops. Once they contact the segment gear (see Illus. 1A or 1B) in the gear operator housing, additional tightening will cause improper adjustment. Reset the locking screw and reinstall the seal plug is the gear unit is for buried service.
- c) For the open (left) travel stop, repeat step b) above with the valve disc fully open.

LUBRICATION

The gear operators are factory packed with approximately 2 lbs of ARCO EP Moly D (also called Molycote LT2) grease .

LUBRICATION INSPECTION:

Look for quality, quantity, and consistency.

- a) Quantity. The worm (see Illus.1A or 1B) and segment gears must be immersed in lubricant.
- b) Quality. Should dirt, water, or any other foreign matter be found in the lubricant, the unit should be flushed with a commercial degreaser/cleanser (i.e., Exxon VARSOL #1 or #3). This degreaser/cleanser must be non-corrosive to steel. Also, it cannot affect Buna-N.
- c) Consistency. The lubricant should be slightly fluid (NGLI-1 or less).

LUBRICATION INSPECTION:

Every 36 months or 1,000 cycles—whichever occurs first.

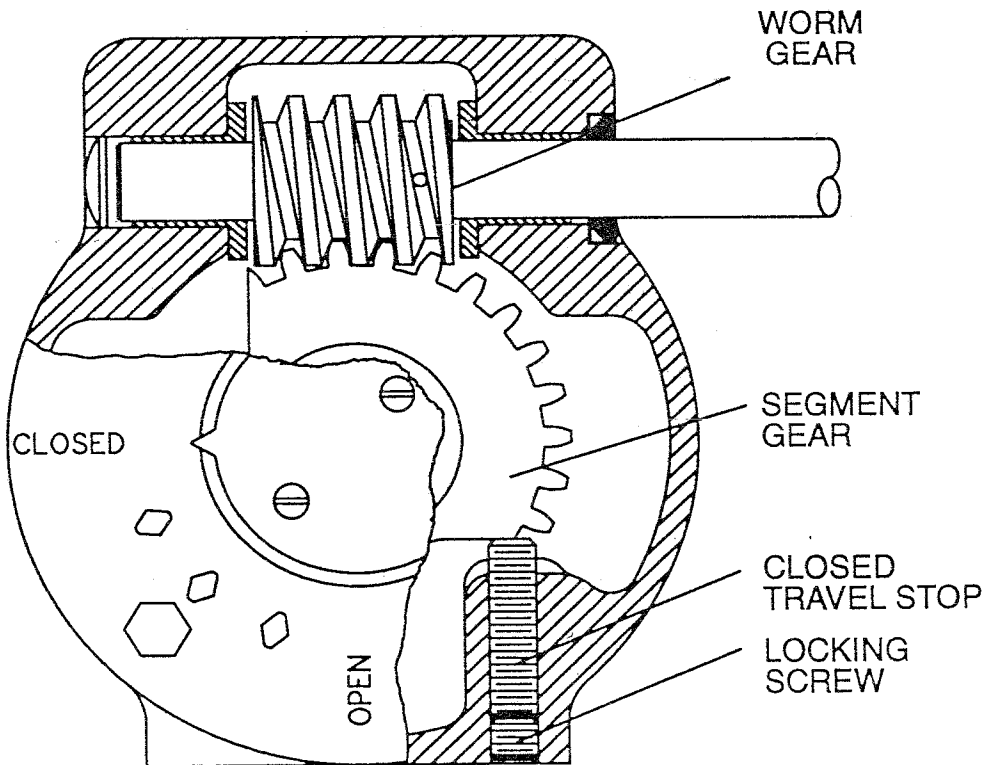
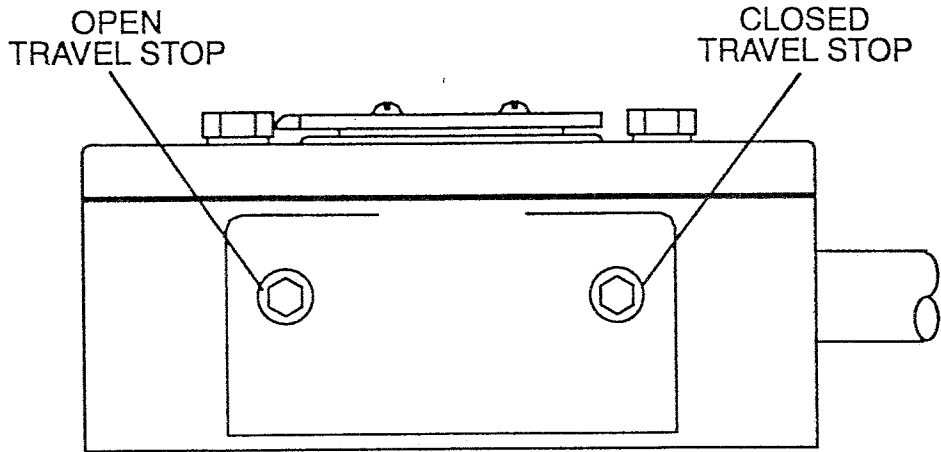
LUBRICATION SUBSTITUTES:

When two pounds of ARCO EP Moly D grease are not available, use any of the lubricants listed in Table 1. If the lubricants listed in Table 1 are not available or not applicable (due to different bases or “soaps” in the lubricants), select a lubricant with the following minimum qualities:

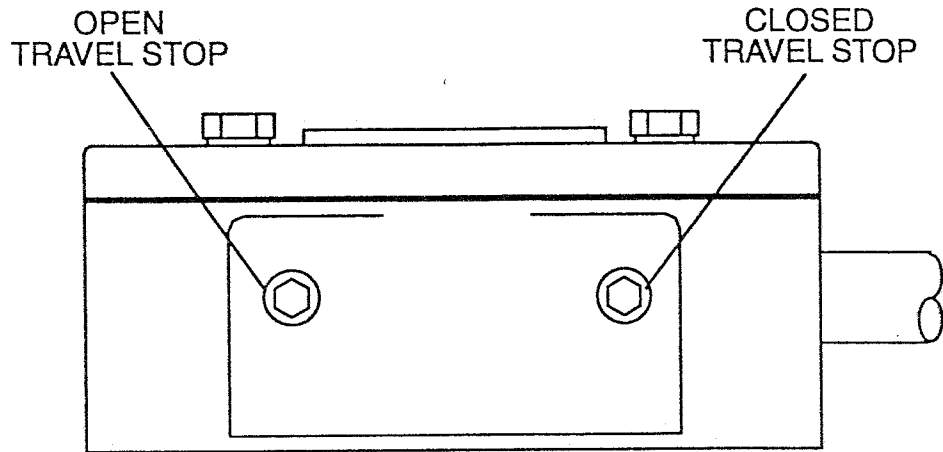
- a) It should contain an EP additive.
- b) It must be suitable for the intended temperature range.
- c) It must be water and heat resistant.
- d) It must be non-separating.
- e) It must not contain any grit, abrasive, or fillers.
- f) It must slump (NGLI grade 0 or 1).
- g) Its dropping point must be above 316° F for ranges of -20° F to 150° F.

TABLE 1
LUBRICATION SUBSTITUTES

MANUFACTURER	TYPE	TEMPERATURE RANGE	BASE
EXXON	HUMBLE P290	-40 TO 120 DEG. F	LITHIUM LIME
GULF OIL	GULFCROWN EPO	-20 TO 220 DEG. F	LITHIUM
MOBIL OIL	MOBILUX EPO	-10 TO 220 DEG. F	LITHIUM 12
SHELL OIL	DARINA	-10 TO 250 DEG. F	HYDROXYSTEARATE (NO SOAP)
TEXACO	LOW TEMP EP	-40 TO 200 DEG. F	LITHIUM

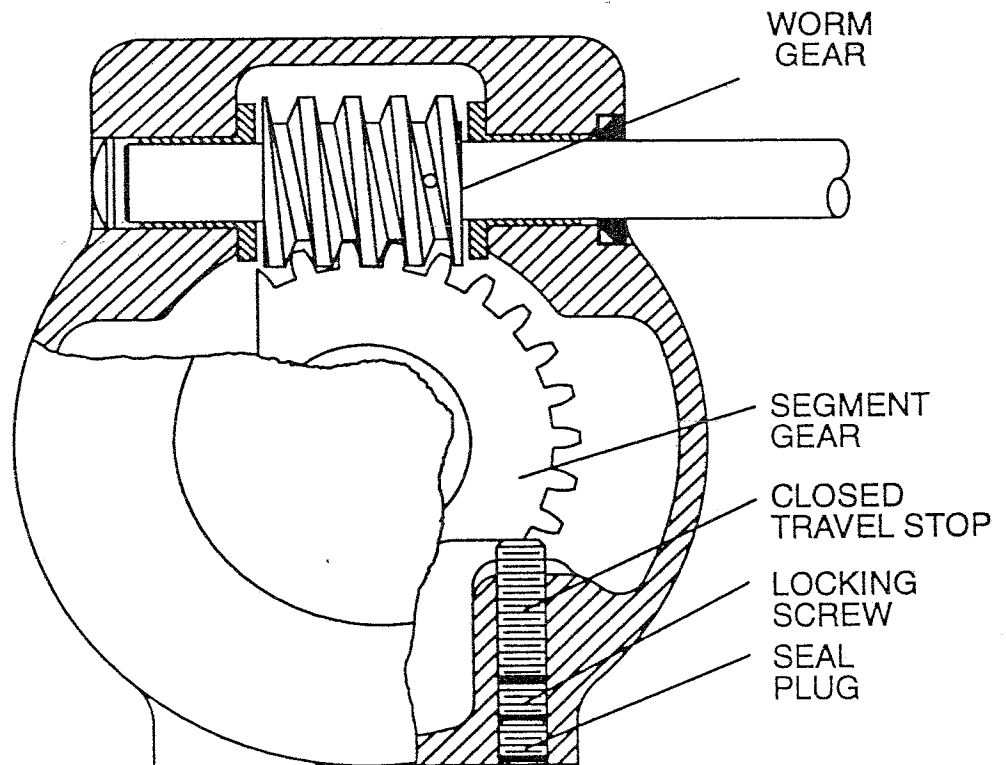


ABOVE GROUND GEAR UNIT
ILLUSTRATION 1A



NOTE:

All buried service operators are completely sealed, packed with grease and have blind mounting holes. The cover is sealed with a permatex gasket.



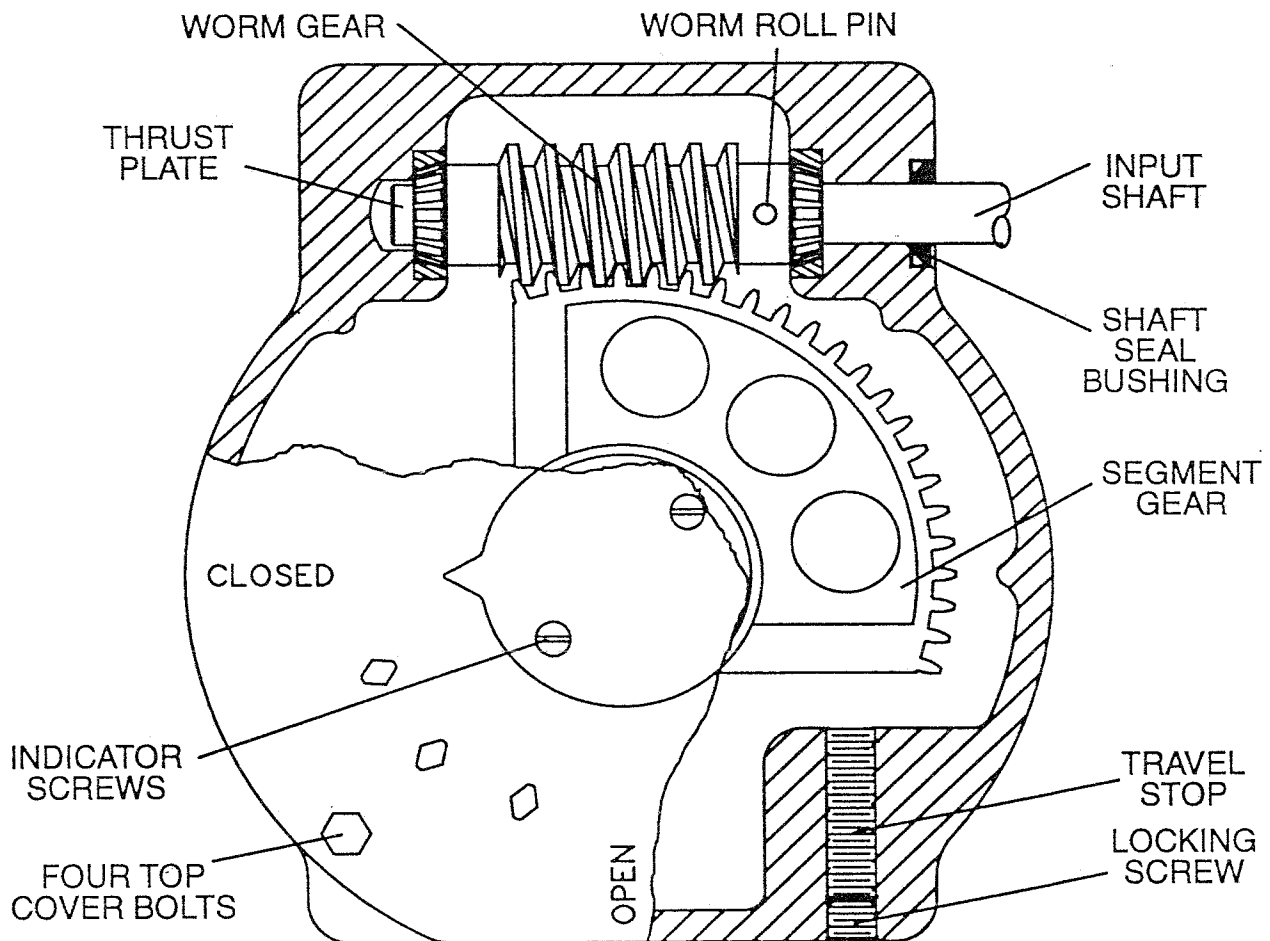
**BURIED SERVICE GEAR UNIT
ILLUSTRATION 1B**

DISASSEMBLY:

WARNING:

Do not attempt to remove the gear unit from a pressurized valve. Once the mounting bolts are removed, the unit will swing. Injury may result. Damage to the line may result when the valve swings shut.

1. Isolate the valve by closing the valves that are just upstream and downstream, in that sequence. Bleed the line material from the shut-off section of the line. If it is not possible to bleed the pressure, be prepared for the line material to spray.



NOTE:

For buried service operators, a seal plug is used after the locking screw.

ILLUSTRATION 2
TYPICAL KEYSTONE MANUAL GEAR OPERATOR

NOTE: Slight differences will be found between the various models of Keystone manual gear operators. The following instructions are "typical" for all models.

- 2) Remove the mounting bolts and lock washers. Remove the gear operator from the valve.
- 3) Remove the seal plug (buried service gear only), locking screw and travel stop screws (see Illus. 2).
- 4) Remove the indicator screws and lift off the indicator plate (above ground gear only).
- 5) Remove the four top cover bolts and washers.
- 6) Remove the segment gear.
- 7) Remove the shaft seal bushing.
- 8) With a 1/8" punch and mallet, drive the worm roll pin 1/4" out of the worm gear. Turn the input shaft so that the shaft roll pin sticks up. Use a pair of pliers to pull the roll pin out.
- 9) Pull the input shaft out of the worm gear.
- 10) Lift the worm gear out of the housing. The shaft seal bushing may be removed and inspected if desired.

INSPECTION:

After disassembling the operator, inspect the following items:

- 1) Inspect the "o" ring and shaft seal bushing for cuts or tears. Replace if needed.
- 2) Inspect the cover gasket for cuts or tears. Replace if needed.
- 3) Inspect the roll pin for excessive wear. Replace if needed.

ASSEMBLY:

- 1) Place the operator housing right-side-up in a vise.
- 2) Lightly grease the wormshaft bushings. (Refer to "LUBRICATION").

- 3) Lightly grease the shaft seal bushing. Put the shaft seal bushing into the gear area and install it into the front of the input shaft bore.
- 4) Install the shaft seal bushing if removed.
- 5) Place the worm gear into the gear unit so that the worm's roll pin hole is away from the handwheel or 2" square nut side.
- 6) Align the roll pin holes in the worm gear and the input shaft. Drive in a roll pin completely into the worm gear with a 1/8" punch and a mallet.
- 7) Roll the "o" ring onto the segment gear. Lightly grease the segment gear.
- 8) Install the segment gear into the housing and mate it to the worm gear.
- 9) Install the travel stop screws, locking screws and seal plug (seal plug used on buried service gear only).
- 10) Pack the gear area with grease. (see "LUBRICATION").
- 11) Put the fiber gasket on the housing. Line up the holes in the gasket with the screw holes in the lower housing.
- 12) Place the cover on the gasket and install the cover bolts.
- 13) Replace the position indicator and install the indicator screws.

TESTING THE OPERATOR:

Once the operator has been fully assembled, cycle it several times. The operation should be smooth with no binding or grinding noises. Travel should be a full 90°.

**TABLE 2
TROUBLESHOOTING THE GEAR OPERATORS**

SYMPTOM	PROBABLE CAUSE	SOLUTION**
THE GEAR UNIT DOES NOT OPERATE THE VALVE	1) THE VALVE'S SEAT IS INDENTED FROM LONGSTANDING.	1) OPERATE THE VALVE MORE FREQUENTLY.
	2) THE VALVE NEEDS MORE TORQUE TO OPEN IT.	2) REPLACE IT WITH A HIGHER RATIO GEAR UNIT.
	3) VALVE PROBLEMS	3) (REFER TO "TROUBLE-SHOOTING" FOR THE VALVE.)
THE GEAR UNIT STOPS BEFORE IT SHOULD.	1) THE TRAVEL STOPS ARE NOT ADJUSTED.	1) ADJUST THE TRAVEL STOPS.
	2) THERE IS GRIT IN THE LUBRICANT.	2) REPLACE THE LUBRICANT.
THE HANDWHEEL TURNS FREELY AND THE POSITION INDICATOR DOES NOT MOVE.	THE ROLL PIN IN THE WORM GEAR IS BROKEN.	REPLACE THE ROLL PIN.
LEAKAGE PAST THE VALVE'S DISC.	1) THE GEAR UNIT'S TRAVEL STOPS ARE NOT ADJUSTED PROPERLY.	1) ADJUST THE TRAVEL STOPS.
	2) (VALVE PROBLEMS.)	2) (REFER TO "TROUBLE-SHOOTING" FOR THE VALVE.)
THE VALVE IS NOT HELD IN POSITION BY THE OPERATOR. THE VALVE CLOSES TOO QUICKLY.	TOO SMALL OF AN OPERATOR.	REPLACE IT WITH A HIGHER-RATIO GEAR UNIT.

** SEE THE TABLE OF CONTENTS FOR THE APPLICABLE PARAGRAPHS.