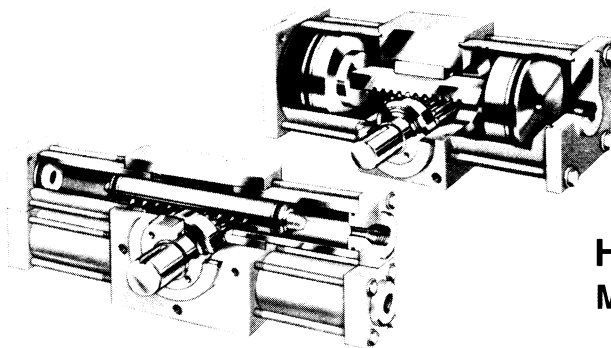


**OHIO OSCILLATOR**



MAINTENANCE INSTRUCTIONS:  
**SERVICE**  
H Series Rotary Actuators  
MODELS H6 THROUGH H133

1707 N. MAIN ST., P.O. BOX 199, ORRVILLE, OHIO 44667-0199

PHONE 330-683-5075

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**MAINTENANCE INSTRUCTIONS**

**MAXIMUM OPERATING PRESSURE – 2000 psi NON-SHOCK**

KEY CONSIDERATION IN THE DISASSEMBLY OF THE UNIT IS DETERMINING THE PINION SHAFT KEYWAY RELATIONSHIP TO THE RACK POSITION TO MAINTAIN PROPER TIMING AT RE-ASSEMBLY

**NOTE:** STANDARD UNITS ARE TIMED WITH THE PINION SHAFT KEYWAY AT 12 O'CLOCK HIGH WHEN LOOKING AT THE MOUNTING HOLE SIDE AS SHOWN ON THE ENCLOSED TYPICAL DRAWING.

**GENERAL**

OHIO OSCILLATOR ROTARY ACTUATORS REQUIRE CLEAN, FILTERED HYDRAULIC OIL FOR SATISFACTORY OPERATION THE SAME AS ANY OTHER HYDRAULIC COMPONENT. THE STANDARD BUNA-N-SEALS ARE DESIGNED FOR HIGH ANILINE POINT FLUIDS.

DISASSEMBLY

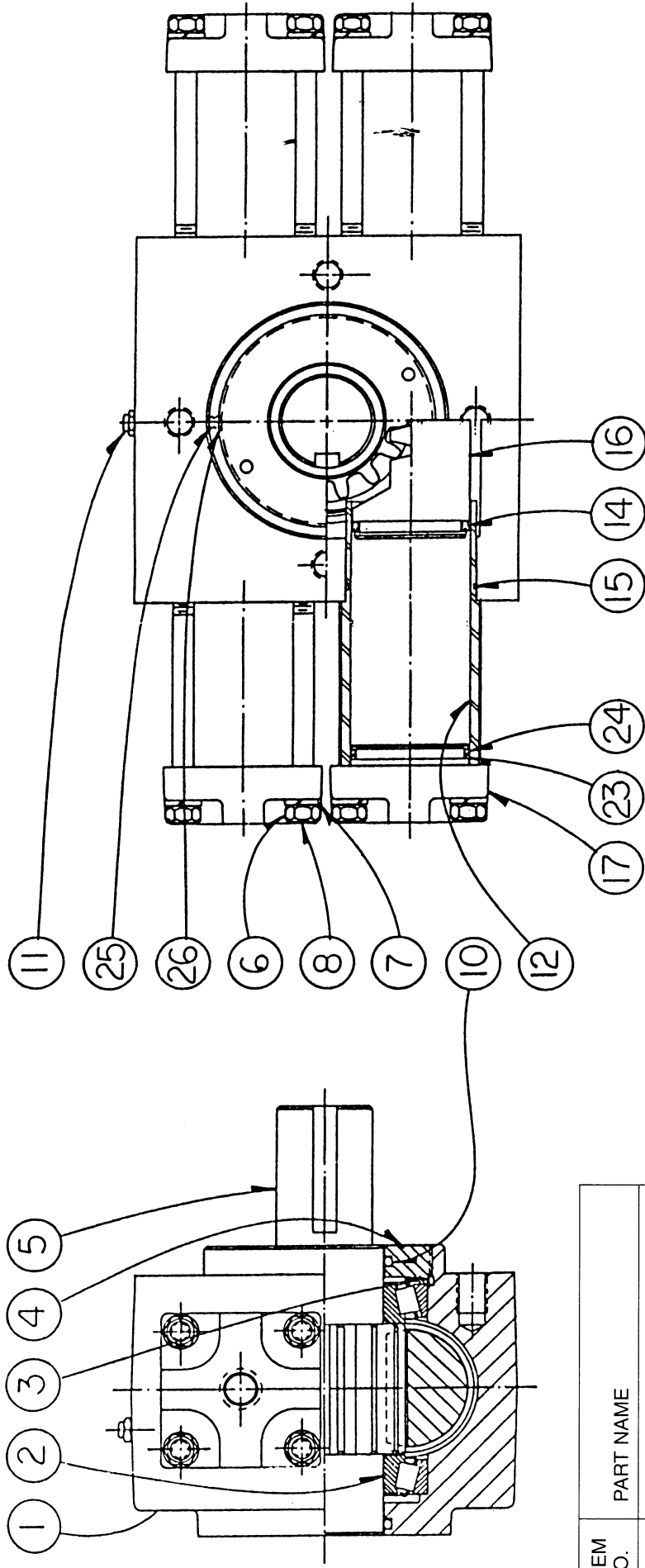
1. Remove all cylinder head tie bolts/tie rods.
2. Remove cylinder heads.
3. Determine that the rack is at mid-point of travel (Equal amounts of rack extended on each side of housing.) Note & record pinion shaft keyway for re-assembly.
4. Back off the bearing cap set screw. Using a spanner wrench, unscrew the threaded bearing cap from the housing.
5. Pull pinion from the housing with the bearing on it. (NOTE: Place unit over a pan or tub before doing this as the unit is filled with gear lubricating oil which will drain from the housing when the pinion is removed.)
6. Remove the cylinder tubes.
7. Remove the piston/rack(s).
8. Remove the back bearing from the housing.
9. Remove all the O-rings and seals. Replace with new O-rings & seals at re-assembly.
10. Thoroughly clean and inspect all parts for wear or damage. Replace with new parts as required. Lubricate with light oil before reassembly.

RE-ASSEMBLY

1. Install new O-rings & seals in their proper grooves (see drawing).
2. Install back bearing in housing.
3. Slide a cylinder tube over one end of the piston/rack assembly. If it is a double rack unit slide a cylinder tube over one end of the second piston/rack assembly.
4. Slide piston/rack assembly and cylinder tube into the housing. If it is a double rack unit slide both piston/rack assemblies & cylinder tubes into the same side of the housing.
5. Attach cylinder head(s) & bolts. Snug bolts up but do not torque until re-assembly is complete.
6. Center rack in housing. (Equal spacing of rack on both sides of housing.)
7. Install pinion with the shaft keyway location as noted during disassembly (Standard unit timing will have keyway at 12 o'clock high location when looking at the front mounting face.)
8. Install cylinder tube(s) on the other side of housing.
9. Attach cylinder head(s) & bolts. Snug bolts up but do not torque until re-assembly is complete.
10. Lay unit down & fill housing with SAE grade 70 oil or other equivalent gear lubricant.
11. Install front pinion bearing & O-ring.
12. Install bearing cap. Tighten bearing cap until snug, then further tighten slightly to pre-load bearing.
13. Insert nylon locking pellet in bearing cap set screw hole. Tighten set screw locking bearing cap.
14. Torque cylinder head bolts evenly by applying force alternately to opposite corners of the head. Torque values per bolt size are shown in the following chart.

MODEL NO.	FASTENER SIZE	RECOMMENDED TORQUE FOR CYLINDER HEAD BOLTS
H6 & H12	1/4 - 20	4 lb. ft.
H19 & H37	5/16 - 18	12 lb. ft.
H67 & H133	7/16 - 14	27 lb. ft.

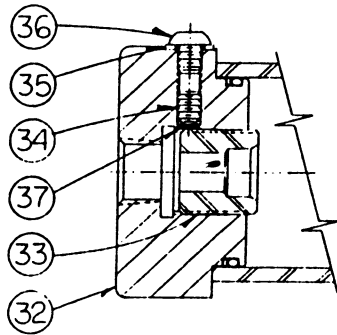
STANDARD MODELS  
H6 THROUGH H133



ITEM NO.	PART NAME
1	HOUSING
2	BEARING
3	O-RING, BEARING CAP
4	BEARING CAP
5	PINION
6	NUT, TIE ROD
7	LOCKWASHER, TIE ROD
8	TIE ROD
9	BOLT, BEARING CAP
10	O-RING, PINION
11	RELIEF VALVE
12	CYLINDER TUBE
14	SEAL, PISTON
15	O-RING, CYL. O.D.
16	PISTON RACK
17	CYLINDER HEAD
18	RACK BEARING
23	BACK UP, CYL. HD.
24	O-RING, CYL. HD.
25	SET SCREW-BEARING CAP
26	NYLON PELLET-BEARING CAP

ALWAYS USE SERIAL NUMBERS AND MODEL  
NUMBERS WHEN ORDERING PARTS.

## 0° TO 5° INTERNAL ADJUSTABLE STOPS



PART NO.	PART NAME	QUANTITY
32	INTERNAL ADJUSTOR-CYL. HD.	1
33	0° TO 5° INTERNAL ADJ. STOP	1
34	SET SCREW-ADJ. STOP	1
35	THREAD SEAL-COVER SCREW	1
36	COVER SCREW	1
37	NYLON LOCKING PELLET	1

### DISASSEMBLY – 0° TO 5° INTERNAL ADJUSTABLE STOPS

1. Remove cover screw & cover screw seal.
2. Remove adjustable stop-set screw.
3. With cylinder head removed from cylinder tube the adjustor can be removed by screwing out towards the inside of the cylinder head with a hex wrench.

### RE-ASSEMBLY - 0° TO 5° INTERNAL ADJUSTABLE STOPS

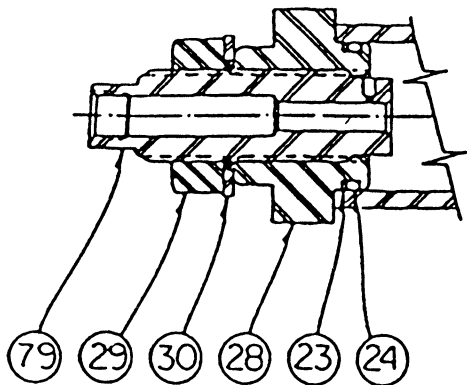
**NOTE:** MUST BE RE-ASSEMBLED BEFORE CYLINDER HEAD IS MOUNTED TO CYLINDER TUBE.

1. Screw adjustor into cylinder head from inside of cylinder head face. Screw all the way in so that rotation can be adjusted at test.
2. Install set screw.
3. Install cover screw seal and cover screw.
4. Adjust rotation at test. Turning adjustor clockwise reduces rotation, counter-clockwise increases rotation.

**NOTE:** ADJUSTMENTS SHOULD NOT BE MADE WHILE UNIT IS UNDER PRESSURE.

## 0° TO 20° EXTERNAL ADJUSTABLE STOPS

### MODELS H6 THROUGH H37



PART NO.	PART NAME	QUANTITY
23	BACK UP, CYL. HD.	1
24	O-RING, CYL. HD.	1
28	EXTERNAL ADJUSTOR CYL. HD.	1
29	JAM NUT	1
30	THREAD SEAL	1
79	CUSHION-EXT. ADJ.-FIXED	1

### DISASSEMBLY – 0° TO 20° EXTERNAL ADJUSTABLE STOPS

On fixed cushion models a cushion orifice has been drilled in the end of the adjustable stop. On Models H6 & H12 the end thread has been machined to allow for orifice relief.

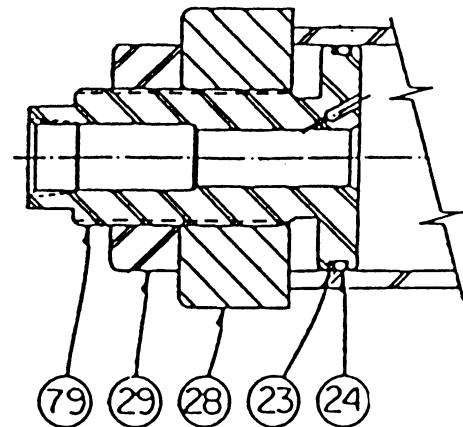
1. **MODELS H6 THRU H37**  
Loosen jam nut & thread seal. Screw adjustor out of cylinder head. Remove thread seal & jam nut.

#### MODELS H67 THRU H133

Screw adjustor out of the cylinder head. Remove O-ring & back-up ring from adjustor head.

2. Thoroughly clean & inspect all parts for wear or damage. Replace with new parts as required.

### MODEL H67 THROUGH H133



### RE-ASSEMBLY - 0° TO 20° EXTERNAL ADJUSTABLE STOPS

#### 1. MODELS H6 THRU H372

- A. Screw adjustor into cylinder head. Thread into head until the adjustor is flush with the inside of the cylinder head (Approx. 6-7 turns).
- B. Install thread seal and jam nut.

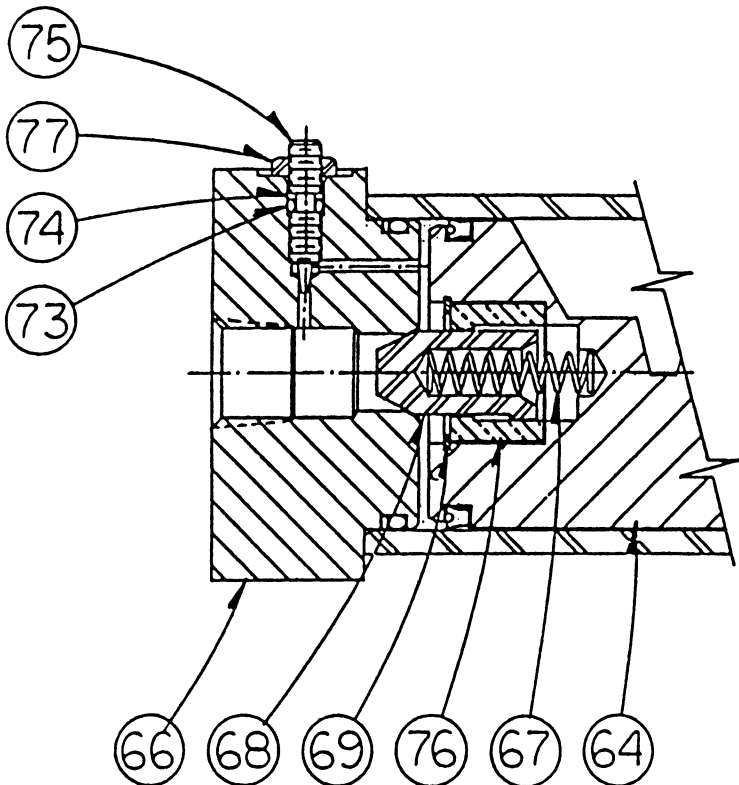
#### 2. MODELS H67 THRU H133

- A. Install new back-up ring & O-ring on adjustor head making sure the flat of the back-up ring is on the cylinder head side of the seal groove & the curved side is toward the O-ring & cylinder tube side. Make sure the O-ring is installed in the curved portion of the back-up ring.
- B. Screw adjustor into the cylinder head from inside of the cylinder head. Screw adjustor all the way in so that rotation can be adjusted at test.
- C. Install lock nut.

3. Adjust rotation at test. Turning adjustor clockwise reduces rotation, counter-clockwise increases rotation.

**NOTE:** ADJUSTMENTS SHOULD NOT BE MADE WHILE UNIT IS UNDER PRESSURE.

# CUSHION DETAILS MODELS H6 THROUGH H133



PART NO.	PART NAME	QUANTITY
65	CUSHION PISTON	1
66	CUSHION CYL. HD.-ADJUSTABLE	1
67	COMPRESSION SPRING	1
68	CUSHION NOSE	1
69	SNAP RING	1
70	CUSHION SEAL PLUG	1
71	O-RING CUSHION SEAL PLUG	1
72	BACK-UP RING-CUSHION SEAL PLUG	1
73	O-RING-CUSHION ADJUSTOR SCREW	1
74	BACK-UP RING-CUSHION ADJUSTOR SCREW	1
75	CUSHION ADJUSTMENT SCREW	1
76	RETAINER CARTRIDGE	1
77	JAM NUT	1

## DISASSEMBLY – ADJUSTABLE CUSHIONS

1. Remove cushion needle jam nut & cushion needle from cylinder head.
2. Remove O-ring & back-up ring. Replace with new parts during re-assembly.
3. Remove cushion nose snap ring from piston.
4. Remove spring retaining cartridge, cushion nose, compression spring from piston.
5. Thoroughly clean & inspect all parts for wear or damage, replace parts as required.

## RE-ASSEMBLY - ADJUSTABLE CUSHIONS

1. Install compression spring, cushion nose & spring retaining cartridge in piston head.
2. Secure in place with the cushion nose snap ring.
3. Install new back-up ring o cushion needle making sure that the curved side faces toward the needle end.
4. Install a new O-ring on the cushion needle making sure that the O-ring fits into the curved side of the back-up ring.
5. Insert the cushion needle in the cylinder head, being careful not to damage the seals. Tighten as far as possible, then loosen 1/2 turn. Install jam nut. Adjust cushion at test.

**NOTE:** ADJUSTMENT SHOULD NOT BE DONE WHILE UNIT IS UNDER PRESSURE.

## CUSHION ADJUSTMENT

**NOTE:** DO NOT ADJUST WHILE UNIT IS UNDER PRESSURE.

1. The control needles of the cushion are installed & locked 1/2 turn from closed when assembled at the factory to prevent premature damaging of the actuator during installation & start-up.
2. Increase cushioning – loosen cushion needle jam nut 1/2 turn to 1 turn. Turn cushion needle clockwise 1/8 turn. Lock jam nut & check cushion action.

**NOTE:** NEVER COMPLETELY CLOSE CUSHION NEEDLES.

3. Decrease cushioning – loosen cushion needle jam nut 1/2 to 1 turn. Turn cushion needle counter-clockwise 1/8 turn. Lock jam nut & check cushion action.

**NOTE:** CAUTION IS TO BE TAKEN WHEN ADJUSTING THE CUSHION NEEDLE THAT IT HAS ADEQUATE THREAD ENGAGEMENT & WILL NOT BLOW OUT OF HOLE.

4. Continue adjusting cushion needles in the above described manner until the desired cushioning effect is obtained.

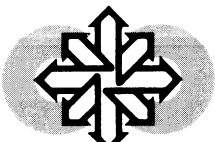
## SEAL LEAKAGE

OHIO OSCILLATOR ROTARY ACTUATORS MAY BE CHECKED FOR PISTON SEAL LEAKAGE AS FOLLOWS:

1. SET UP ACTUATOR WITH RELIEF FITTING UP.
2. PRESSURIZE CYLINDER PORTS INDIVIDUALLY.
3. IF OIL FLOWS FROM RELIEF PORT AFTER PISTON HAS COMPLETED IT'S TRAVEL AND SET 3 MINUTES UNDER PRESSURE, ALL PISTON SEALS SHOULD BE REPLACED.

FOR FURTHER MAINTENANCE INFORMATION CONTACT YOUR NEAREST FLO-TORK REPRESENTATIVE OR  
FLO-TORK, INC., ORRVILLE, OHIO 44667

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