

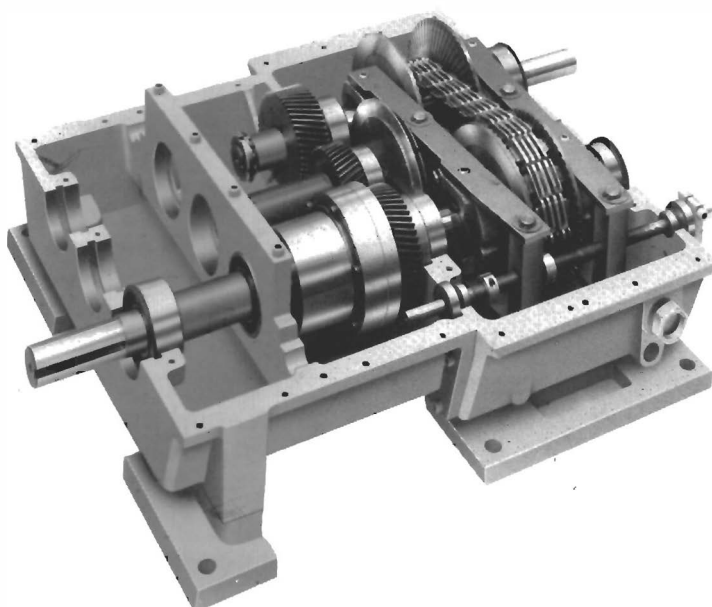


BULLETIN 217-IOM



DRAW TRANSMISSIONS

Installation, Operating and
Maintenance Instructions



The FAIRCHILD HARMONIC DRIVE Draw Transmission incorporates strain wave gearing principles which allow application of the unit in precise control of equipment.



5633 W Howard St.
Niles, IL 60714

Tel: (847) 588-2639
www.candycontrols.com

Principles of Operation

The base components of the FAIRCHILD HARMONIC DRIVE DRAW TRANSMISSION are an infinitely variable all metal chain and wheel face combination and a HARMONIC DRIVE differential. The input to the transmission drives the constant speed pulley of the variable element and the circular spine of the HARMONIC DRIVE. By controlling the speed of the wave Generator of the HARMONIC DRIVE through gearing from the adjustable shaft of the variable chain connection, the output of the HARMONIC DRIVE is controlled within a highly compressed speed range. Within the HARMONIC DRIVE, the teeth on

the nonrigid flexible spline and the rigid circular spline are in continuous engagement. (The outer race of the wave generator is the flexible spline.) The Flexspline has two teeth fewer than the circular spline. One revolution of the Wave Generator input causes relative motion between the Flexspline and the Circular spline equal to two teeth. With the Circular Spline rotationally fixed, the Flexspline will rotate in a direction opposite to the input at a reduction ratio equal to the number of teeth on the Flexspline divided by two.

Installation

Mount unit securely on a flat, rigid foundation without any flexing. Mounting pads of transmission must rest firmly on the foundation before bolting down. Shims should be used for leveling.

All Specon HDD transmissions are shipped without oil. Before starting, add the specified quantity of oil. Use an AGMA 3EP grade oil. (See Table 1 for acceptable oils.) Check oil level at the sight gage. Oil should be at the specified level with the transmission stationary. After the first fifty hours of operation and every 2000 hours thereafter, change the oil. Oil can be added to the transmission either through the breather plug on the top or through the inspection cover. Before refilling with new oil, flush the transmission with a lightweight machine oil. Do not use any paraffin oil or solvents.

Adjustment

Adjustments to the VARI-CHAIN unit are described in Bulletin 207 IOM and 207-84 IOM.

Maintenance — VARI-CHAIN

(Typical for -66, 72, 79 configuration)

In addition to the oil changes, as mentioned under lubrication, the chain wear indicator must be periodically checked. To inspect indicator, remove VARI-CHAIN housing cover and note indicator wear, 0, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, and $\frac{4}{4}$ wear as shown on disc. Chain wear automatically causes the spiral spring to turn the tension shaft, thus maintaining proper chain tension. Full chain wear is indicated by $\frac{4}{4}$ (1 revolution of disc). At this setting the fully worn chain must be replaced.

Lubrication

Table 1 — Acceptable Oils

Name of Manufacturer	Name of Lubricant
Mobil Oil Company	Mobil Gear 627

*All Oils meet current standards for
AGMA 3EP gear lubricants.

Operation

The Specon HDD Draw Transmission is a self-contained unit which includes the VARI-CHAIN. In order to vary the output ratio (percent of draw for HDD Transmission) turn the control handwheel to the desired setting. Vary the ratio ONLY when the drive is in operation.

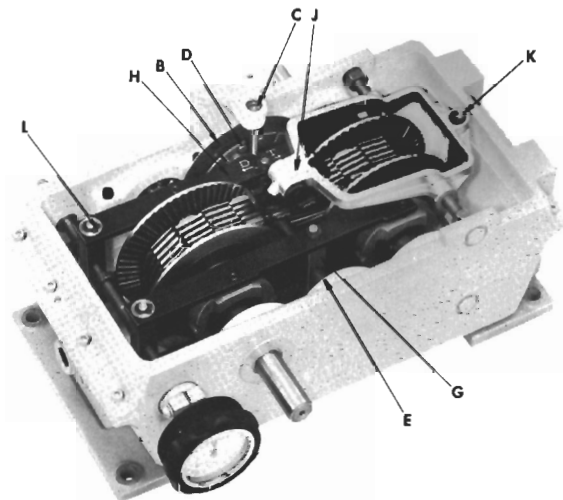


Figure 1

Disassembly

To remove the upper housing, take off inspection cover and remove blocking screw (C) (Figure 1). Remove the bolts at each end of the transmission and eight bolts inside the transmission. Six of these bolts can be removed through the inspection cover. The remaining two can be reached through the oil breather plug hole on each side of the nameplate. The top shoe (J) will be removed with the upper half of the housing. Caution should be exercised in removing the spring support rod (K) to retain the spring and washer with the spring support rod.

The entire internal assembly can now be removed from the lower housing. The control screw assembly can now be removed by removing the snap rings from each end of the control pivot blocks (L). With the control assembly removed, care should be exercised so as not to destroy the position relationship of the two control pivot blocks. Do not turn one pivot block independent of the other. In order to complete the disassembly of the internals, the control levers (H) must be removed. Remove only the top set or bottom set of control levers at any given time. This retains the position relationship of the adjustable pivots (G) on the pivot block screw (E). If it is necessary to remove both top and bottom control levers, exercise care to maintain the relative position of the two adjustable pivots on the pivot block screw. During disassembly, note should be taken of the relative location of all parts so that each individual part can be reassembled correctly to the correct adjoining part.

Reassembly

Reassemble the individual internal assembly taking care to insure that individual parts are assembled into the exact location from which they were removed. The entire internal assembly including the control screw can be made up before it is inserted into the lower housing.

The wave spring washer (53), (Parts list Size 1-5) on the control screw bushings (56), must go on the outside of the transmission housing and care must be taken to insure that they are not pinched between the housing halves. (This applies to Sizes 1-5 only.)

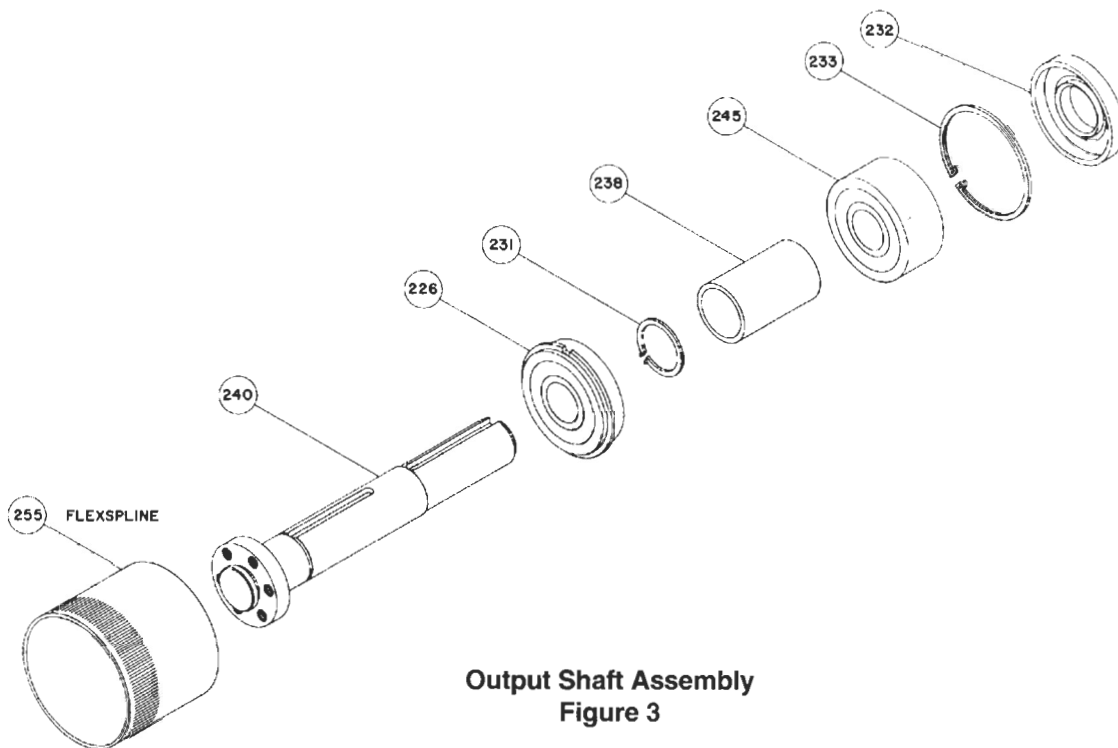
Locate lower end of spring support rod (24) (Parts list Size 0-1/2 and Size 1-5) in the hole of bottom shoe bracket (18). Compress spring and washer until drilled hole in rod is exposed and insert a piece of wire to hold the compression allowing wire to lay across top of chain. Apply non-hardening permatex to the mating surfaces of both housing halves. While lowering top half of housing, locate upper end of shoe lever rod in hole of upper shoe bracket.

Insert dowel pins (7). Secure bolts and remove wire from transmission. Recheck chain tensioner setting in accordance with chain tensioner instructions.

Installing New Chain

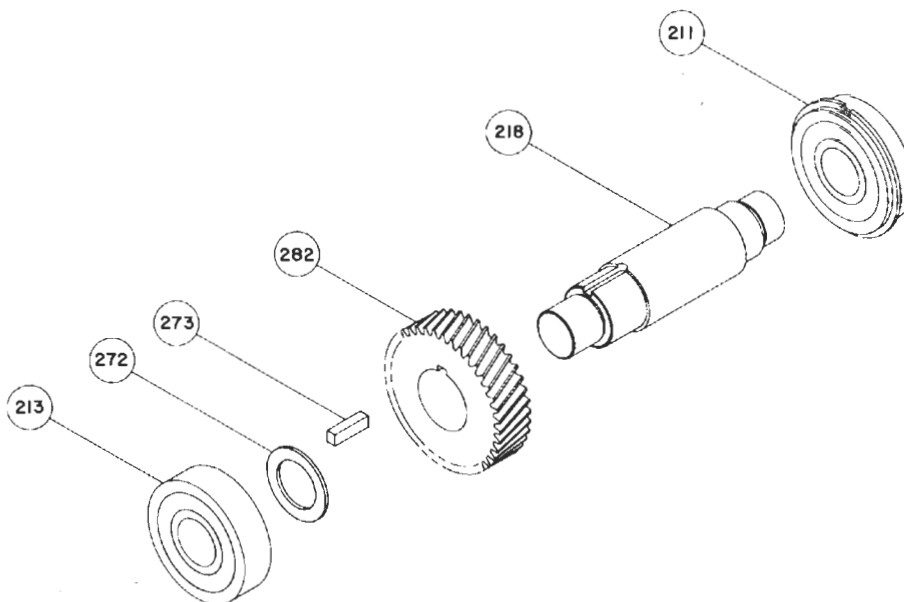
- Set transmission at 1:1 ratio, indicator setting at zero. (Remember change ratio only when transmission is running.)
- Disconnect motor or drive.
- Remove inspection plate.
- Support upper shoe (J) (Figure 1) in position away from chain. (Except Size 0, which has no tensioning shoes).
- Remove blocking screw (C).
- Turn tension flange (D) in direction marked "D" as shown on control lever (H) to slacken chain. (Use screwdriver in slots of flange.)
- Using blocking pin as reference, rotate flange through two revolutions.
- Locate connecting pin in chain and remove.
- Using old connecting pin, attach one end of new chain to end of old chain.
- Pull old chain out of transmission and thread new chain around wheel faces into transmission.
- Withdraw old connecting pin, separating old and new chain.
- Connect the ends of new chain with the new connecting pin using new washer and cotter pin.
- Turn tension flange in direction marked "T" (clockwise rotation) until wheel faces are snug against the chain. For VARI-CHAIN models 1 thru 5 continue clockwise rotation of the tension flange (using screwdriver in slots) until ratchet sounds cease indicating the automatic spring is fully loaded. Back off tension flange to line up stops with blocking screw. For VARI-CHAIN models 0 and 1/2, proceed by inserting blocking screw into the outside tension flange, thus blocking rotation of the outside tension flange and releasing outside ratchet. Finally load spiral spring by turning the inside tension flange in a counter-clockwise direction until ratchet sounds cease. Rotate the transmission by hand during this setting.
- Continue to rotate the transmission a few times by hand to free the slats. For transmissions equipped with the indicator disc, the "0" mark on the indicator should be positioned just to the left of the blocking screw. After running approximately one hour, recheck indicator plate and reset "0" slightly to the left of the blocking screw if necessary. (This will prevent premature chain wear indications.)
- Replace inspection cover, reconnect motor or drive and proceed with normal usage.

4



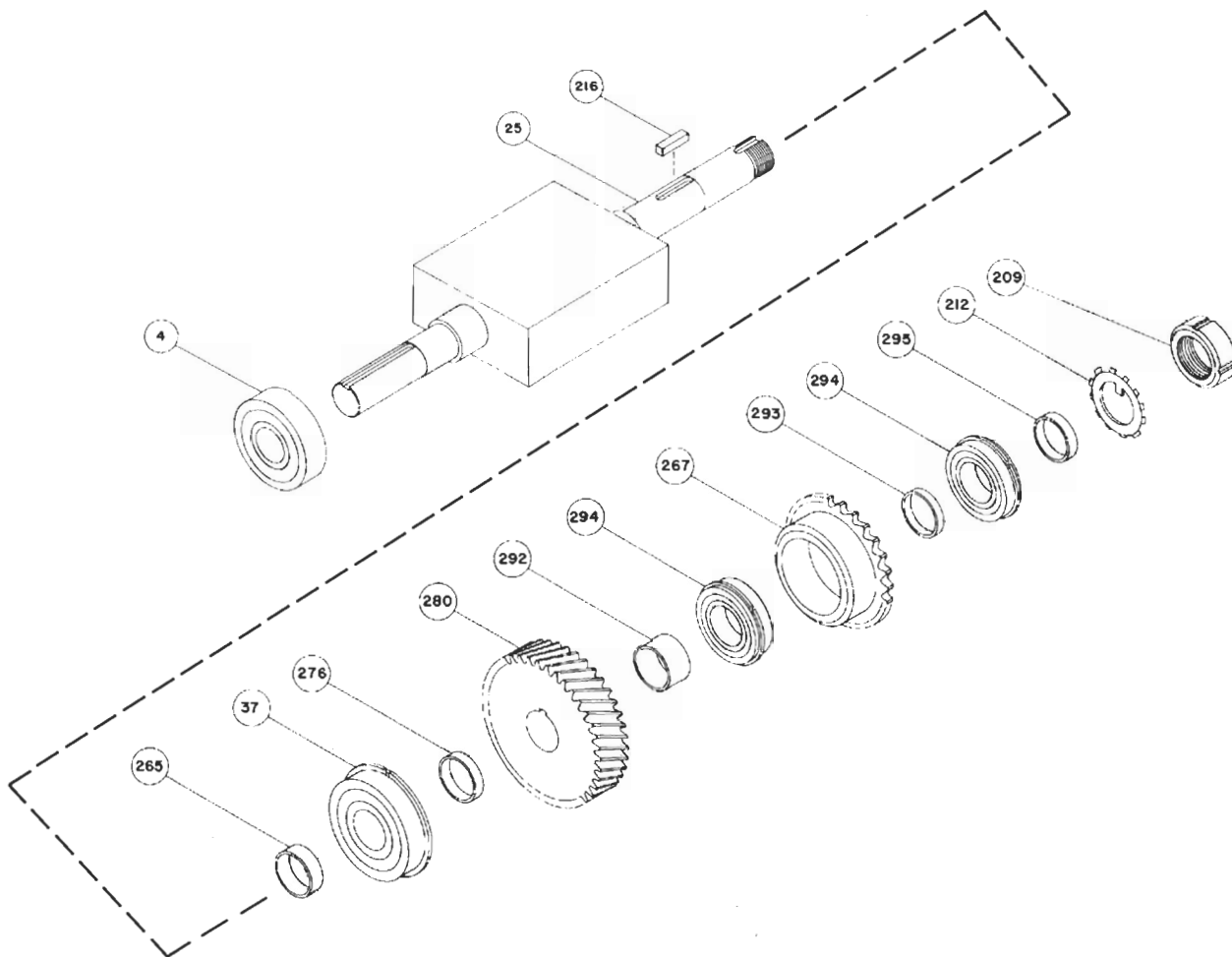
2. Output Shaft Assembly

- a. Obtain Output Shaft (240). Obtain Bearing (226) and press on shaft. Install Snap Ring (231).
- b. Place Spacer (238) on Shaft (240) and press Bearing (245) on shaft.
- c. Fasten Flexspine onto the assembly in step b with six Screws (244). Coat Screws with Loctite 242.
- d. Insert assembly in Step c into Circular Spline (221) and lay it into the HDD Housing (201).
- e. Insert Snap Ring (233) at Output Shaft end and (29) at Wheelface end of Shaft. Install Seal (232).



3. Connecting Shaft Assembly

- a. Obtain Connecting Shaft (218).
- b. Place Key (273) on shaft (218).
- c. Place Intermediate Pinion (282) on the shaft. Add Spacer (272). A shim may be required between
- d. Press Bearing (211) on the other end of the Shaft. Lay the assembly in step d into Housing (201).



Constant Speed Shaft Assembly
Figure 5

4. Constant Speed Shaft Assembly

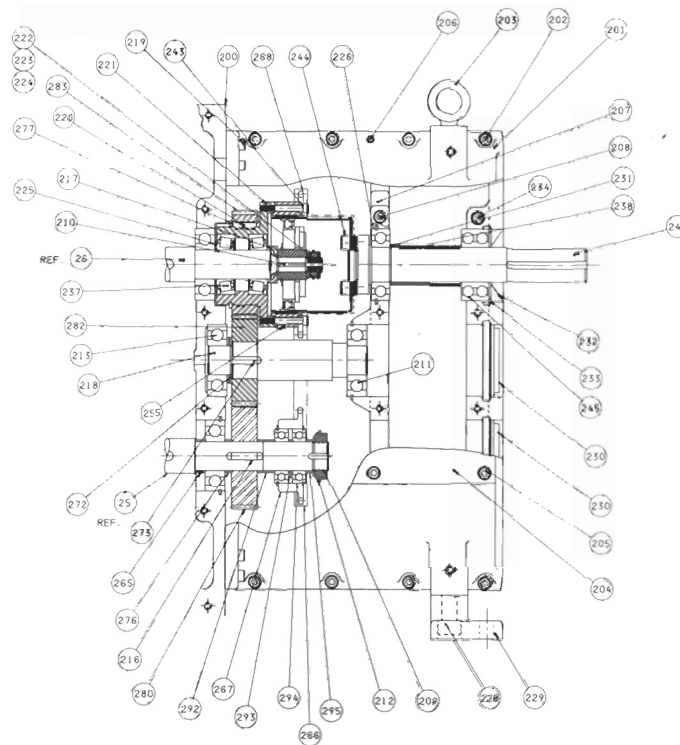
- a. Obtain Constant Speed Shaft (25).
- b. Place Spacer (265) on the Shaft at the threaded end.
- c. Press Bearing (37) on the Shaft against the Spacer (265).
- d. Place Spacer (276) on the Shaft against Bearing (37).
- e. Place Key (273) on Shaft (25).
- f. Press Constant Speed Shaft Gear (280) on Shaft (25). Place Spacer (292) on the Shaft.
- g. Use Spacer (293) to separate Bearings (294) and assemble bearings and Spacer into Sprocket (267)

- h. Press assembly in Step g on Shaft (25) against Spacer (292).
- i. Place Spacer (295) on Shaft (25).
- j. Place Lockwasher (212) and Locknut (209) on Shaft (25). Bend tab into Locknut.

5. Final Assembly

- a. Place Wheelfaces on Shaft (25).
- b. Press on Bearing (4) and Snap Ring (35).
- c. Insert the Constant Speed Shaft (25) into the Varichain/HDD Housing.
- d. Assemble Roller Chain (266) around the sprockets.
- e. Proceed to the Assembly of the Varichain (Figure 1).

IHDDZ-89 Type A



Common Parts

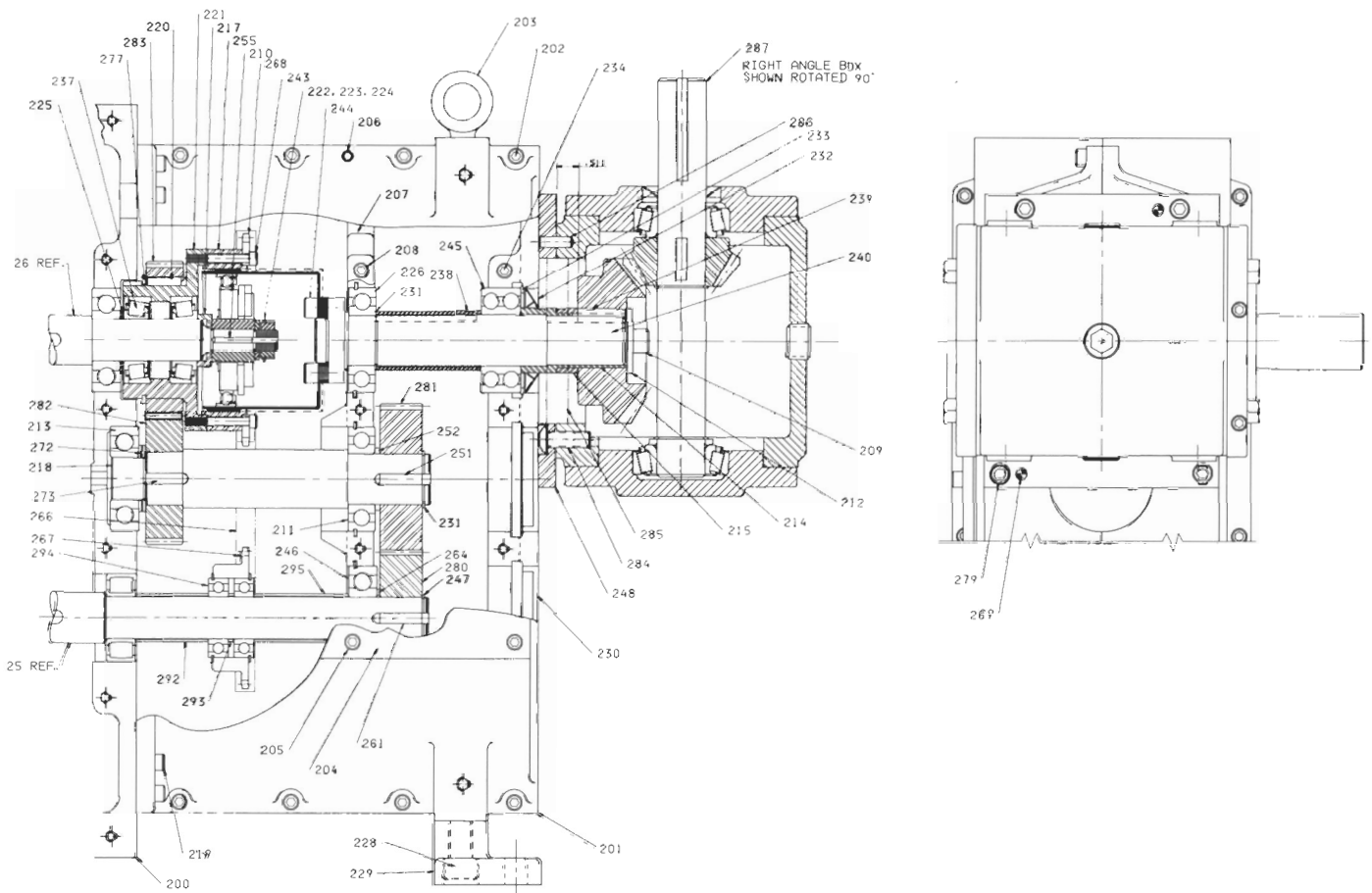
Loc No.	Description	Qty.
4	Bearing on CSS	1
4	Bearing on VSS	1
5	Bearing on VSS	1
26	Shaft, VSS	1
36	Snap Ring	1
37	Bearing on CSS	1
203	Eye Bolt	1
204	Inspection Cover	1
205	Sckt Hd Cap Screw	8
206	Roll Pin	1
207	Bearing Bridge	1
210	Key	1
213	Bearing	1
217	Wave Generator Spcr	1
221	Circular Spline Hub	1
222	N-01 Locknut	1
223	W-01 Lockwasher	1
224	Tongued Washer	1
225	Thrust Race	1
228	Hex Sckt Hd Cap Screw	4
229	Mounting Foot	1
230	Closure	1
231	Snap Ring	1
233	Bevel Snap Ring	1
234	Hex Sckt Hd Cap Screw	4
237	Taper Roller Bearing	2
240	Output Shaft	1
244	Hex Sckt Hd Cap Screw	6
277	Snap Ring	1
282	Intermediate Pinion	1
283	Harmonic Gear	1

IHDDZ-89 Type A

Loc No.	Description	Qty.
25	Shaft, CSS	1
200	Varichain Transmission Assembly	1
201	Housing Assembly	1
202	Sckt Head Cap Screw	8
208	Sckt Head Cap Screw	4
209	N-05 Locknut	1
211	Bearing	1
212	N-05 Lockwasher	1
216	Key	1
218	Connecting Shaft	1
219	Sckt Head Cap Screw	16
220	Key	1
226	Bearing	1
232	Seal	1
238	Output Shaft Spacer	1
243	Sckt Head Cap Screw	6
245	Bearing	1
255	Harmonic Drive Cmpts	1
265	Spacer	1
*266	Roller Chain	1
*267	Sprocket	1
*268	Sprocket	1
272	Pinion Spacer	1
273	Key	1
276	Spacer	1
280	CSS Gear	1
*292	Spacer	1
*293	Spacer	1
*294	Bearing	2
*295	Spacer	1

*For Vertical Units Only

RAIHDDZ-89 Type A

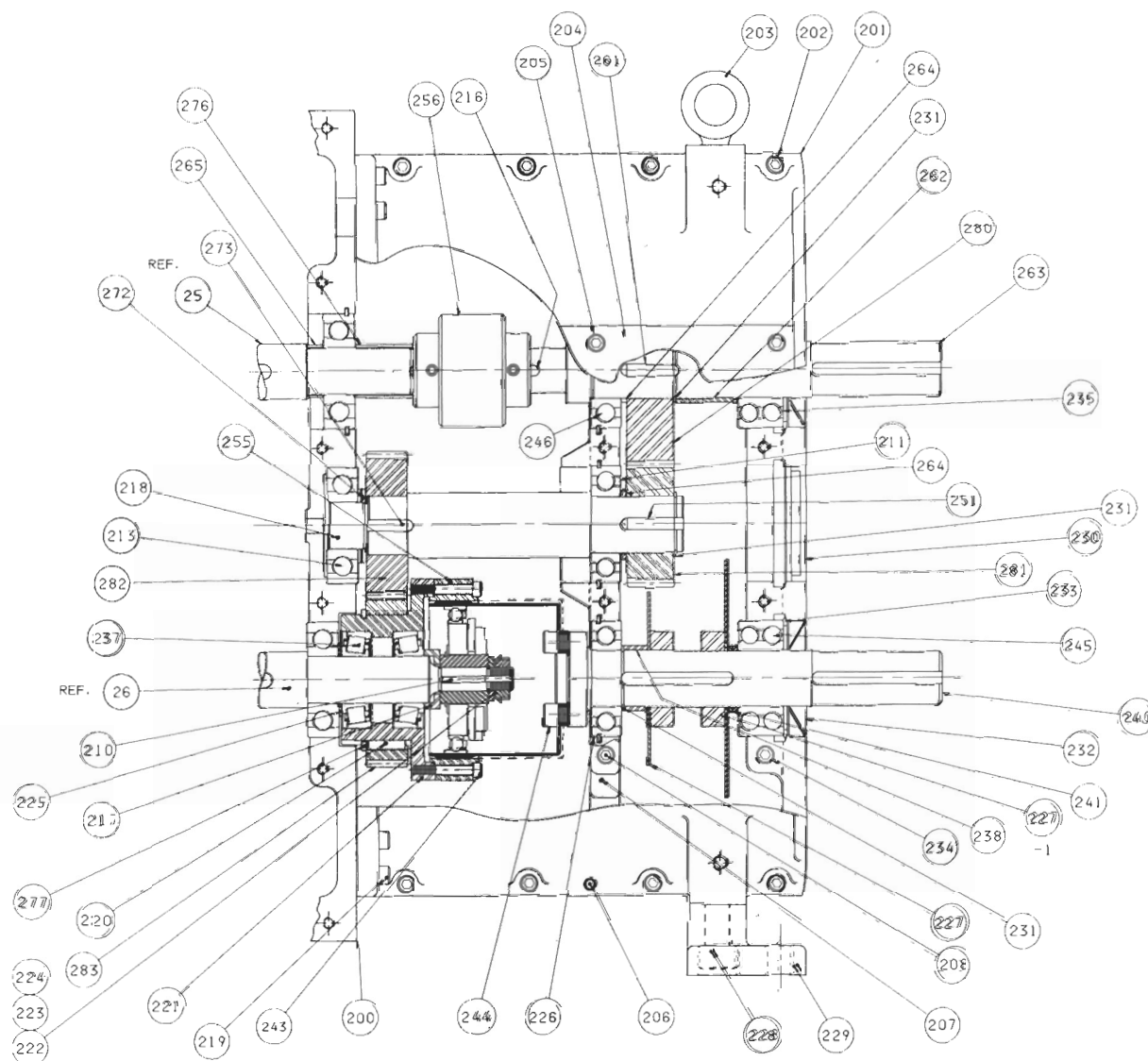


RAIHDDZ-89 Type A

Loc No.	Description	Qty.	Loc No.	Description	Qty.
25	Shaft, CSS	1	251	Key	1
200	Vairchain Transmission Assembly	1	252	Spacer	2
201	Housing Assembly	1	255	Harmonic Drive Cmpts	1
202	Hex Sckt Head Cap Screw	8	261	Key	1
208	Screw	4	264	Spacer	1
209	Hex Sckt Head Cap Screw	1	*266	Roller Chain	1
211	Bearing	1	*267	Sprocket	1
212	Washer	1	*268	Sprocket	1
214	Seal and Gear Bushing	1	269	Dowel Pin	2
215	Spacer	1	272	Spacer	2
218	Connecting Shaft	1	273	Spacer	1
219	Hex Sckt Head Cap Screw	16	274	Key	1
220	Key	1	279	Hex Sckt Head Cap Screw	4
226	Bearing	1	280	Input Gear	1
232	Seal	1	281	Input Gear	1
238	Spacer	1	284	Button Head Cap Screw	4
239	Key	1	286	Dowel Pin	1
243	Hex Sckt Head Cap Screw	6	287	Bevel Gear Drive	1
245	Bearing	1	*292	Spacer	1
246	Bearing	1	*293	Spacer	1
247	Snap Ring	1	*294	Bearing	2
248	Mounting Plate	1	*295	Spacer	1

*For Vertical Units Only

1HDD-89 Type B



1HDD-89 Type B

Loc No.	Description	Qty.	Loc No.	Description	Qty.
200	Varichain Transmission Assembly	1	245	Bearing	1
201	Housing Assembly	1	246	Bearing	1
202	Hex Sckt Head Cap Screw	8	251	Key	1
208	Hex Sckt Head Cap Screw	1	255	Harmonic Drive Cmnts	1
211	Bearing	1	256	Sleeve Coupling	1
216	Key	2	261	Key	1
218	Connecting Shaft	1	262	Spacer	1
219	Hex Sckt Head Cap Screw	16	263	Input Shaft	1
220	Key	1	264	Spacer	1
226	Bearing	1	265	Spacer	1
227	Slinger	1	272	Spacer	2
232	Seal	1	273	Spacer	1
235	Bearing	1	274	Key	1
238	Spacer	1	280	Input Gear	1
241	Spacer	2	281	Input Gear	1
243	Hex Sckt Head Cap Screw	6			

