

Parts Replacement Manual
For
HYDROIL™
TORQUE-ARM™
Speed Reducers
Taper Bushed
For Char-Lynn H, S, T and 2000 Series
6B Spline Motors

SIZES: HXT625
HXT725

WARNING: Because of the possible danger to persons(s) or property from accidents which may result from the improper use of products, it is important that correct procedures be followed. Products must be used in accordance with the engineering information specified in the catalog. Proper installation, maintenance and operation procedures must be observed. The instructions in the instruction manuals must be followed. Inspections should be made as necessary to assure safe operation under prevailing conditions. Proper guards and other suitable safety devices or procedures as may be desirable or as may be specified in safety codes should be provided, and are neither provided by Baldor Electric Company nor are the responsibility of Baldor Electric Company. This unit and its associated equipment must be installed, adjusted and maintained by qualified personnel who are familiar with the construction and operation of all equipment in the system and the potential hazards involved. When risk to persons or property may be involved, a holding device must be an integral part of the driven equipment beyond the speed reducer output shaft.

BALDOR

World Headquarters
P.O. Box 2400, Fort Smith, AR 72902-2400 U.S.A., Ph: (1) 479.646.4711, Fax (1) 479.648.5792, International Fax (1) 479.648.5895
Dodge Product Support
6040 Ponders Court, Greenville, SC 29615-4617 U.S.A., Ph: (1) 864.297.4800, Fax: (1) 864.281.2433
www.baldor.com

© Baldor Electric Company

MN1665
(Replaces 499830)



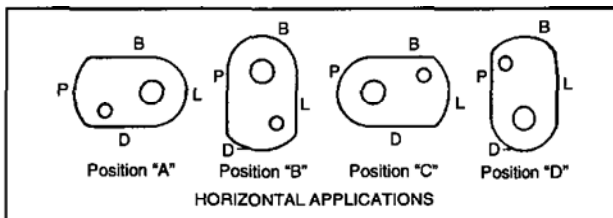
All Rights Reserved. Printed in USA.

06/30/09

REDUCER INSTALLATION

1. Replace the plastic plug that protects the threaded hole in the reducer housing with the eyebolt supplied with the reducer.
2. Determine the running positions of the reducer (see Fig. 1). Note that the reducer is supplied with either 4 or 7 plugs; 4 around the sides for horizontal installations and 1 on each face for vertical installations. These plugs must be arranged relative to the running positions as follows:

Horizontal Installations—Install the magnetic drain plug in the hole closest to the bottom of the reducer. Throw away the tape that covers the filler/ventilation plug in shipment and install plug in topmost hole. Of the 3 remaining plugs on the sides of the reducer, the lowest one is the minimum oil level plug.



B: Breather; D: Drain; L: Oil Level Plug; P: Plug

Fig. 1 — Mounting Positions

The running position of the reducer in a horizontal application is not limited to the four positions shown in Figure 1. However, if running position is over 20° either way from sketches, the oil level plug cannot be safely used to check the oil level, unless during the checking the torque arm is disconnected and the reducer is swung to within 20° in positions “B” and “D” or 5° in positions “A” and “C” of the positions shown in Figure 1. Because of the many possible positions of the reducer, it may be necessary or desirable to make special adaptations using the lubrication fitting holes furnished along with other standard pipe fittings, stand pipes and oil level gages as required.

3. Mount Taper Bushed reducer on driven shaft per instruction sheet No. 499629 packed with tapered bushings.
4. Install torque arm and adapter plates using the long reducer bolts. The bolts may be shifted to any of the holes on the input end of the reducer.
5. Install torque arm fulcrum on a rigid support so that the torque arm will be approximately at right angles to the center line through the driven shaft and the torque arm anchor screw.

CHAR-LYNN H, S, T AND 2000 SERIES 6B SPLINE MOTOR INSTALLATION

Consult the local Char-Lynn Motor dealer for hydraulic motor information.

REDUCER LUBRICATION

Important: Because reducer is shipped without oil, it is necessary to add the proper amount of oil before running. Use a high grade petroleum base, rust and oxidation inhibited (R & O) gear oil—see tables. Follow instructions on reducer nameplate, warning tags, and in the installation manual.

Under average industrial operating conditions, the lubricant should be changed every 2500 hours of operation or every 6 months, whichever occurs first. Drain reducer and flush with kerosene, clean magnetic drain plug and refill to proper level with new lubricant.

CAUTION

Too much oil will cause overheating and too little will result in gear failure. Check oil level regularly. Failure to observe this precaution could result in damage to or destruction of the equipment.

Under extreme operating conditions, such as rapid rise and fall of temperature, dust, dirt, chemical particles, chemical fumes, or oil sump temperatures above 200°F, the oil should be changed every 1 to 3 months depending on severity of conditions.

Table 1 – Oil Volumes

Reducer Size	Volume of Oil Required to Fill Reducer to Oil Level Plug											
	† Position A			† Position B			† Position C			† Position D		
	Fluid Ounces (Approx)	▲ Quarts (Approx)	Liters (Approx)	Fluid Ounces (Approx)	▲ Quarts (Approx)	Liters (Approx)	Fluid Ounces (Approx)	▲ Quarts (Approx)	Liters (Approx)	Fluid Ounces (Approx)	▲ Quarts (Approx)	Liters (Approx)
HXT615 HXT625	136	4¼	4.0	160	5	4.7	136	4¼	4.0	160	5	4.7
HXT715 HXT725	208	6½	6.1	256	8	7.6	232	7¼	6.9	296	9¼	8.7

† Refer to Fig. 1 on page 2 for mounting positions.
 ▲ U.S. Measure: 1 quart = 32 fluid ounces = .94646 liters.

Note: If reducer position is to vary from those shown in Figure 1 either more or less oil may be required. Consult factory.

Minimum Oil Recommendations for Average Operating Conditions

Table 2 — Lubrication Recommendations —
ISO Grades for Ambient Temperatures of 15° to 60°

Output RPM	Reducer Size														
	1	2	3	4	5	6	7	8	9	10	12	13	14	15	
301-400	220	220	150	150	150	150	150	150	150	150	150	150	150	150	
201-300	220	220	150	150	150	150	150	150	150	150	150	150	150	150	
151-200	220	220	150	150	150	150	150	150	150	150	150	150	150	150	
126-150	220	220	220	150	150	150	150	150	150	150	150	150	150	150	
101-125	220	220	220	220	150	150	150	150	150	150	150	150	150	150	
81-100	220	220	220	220	220	150	150	150	150	150	150	150	150	150	
41-80	220	220	220	220	220	150	150	150	150	150	150	150	150	150	
11-40	220	220	220	220	220	220	220	220	220	220	150	150	150	150	
1-10	220	220	220	220	220	220	220	220	220	220	220	220	220	220	

Below - 23°F call application engineering.
20°F to -22°F use Mobil SHC 627.
Above 125°F use Mobil SHC 634.

NOTE:

Pour point of lubricant selected should be at least 10°F lower than expected minimum ambient starting temperature.

See page 8 for lubricant viscosity classification equivalents.

CAUTION

Extreme pressure (EP) lubricants are not recommended for average operating conditions. Failure to observe these precautions could result in damage to, or destruction of, the equipment.

Table 3 — Lubrication Recommendations —
ISO Grades for Ambient Temperatures of 15° to 125°

Output RPM	Reducer Size														
	1	2	3	4	5	6	7	8	9	10	12	13	14	15	
301-400	320	320	220	220	220	220	220	220	220	220	220	220	220	220	
201-300	320	320	220	220	220	220	220	220	220	220	220	220	220	220	
151-200	320	320	220	220	220	220	220	220	220	220	220	220	220	220	
126-150	320	320	320	220	220	220	220	220	220	220	220	220	220	220	
101-125	320	320	320	320	220	220	220	220	220	220	220	220	220	220	
81-100	320	320	320	320	320	220	220	220	220	220	220	220	220	220	
41-80	320	320	320	320	320	220	220	220	220	220	220	220	220	220	
11-40	320	320	320	320	320	320	320	320	320	320	220	220	220	220	
1-10	320	320	320	320	320	320	320	320	320	320	320	320	320	320	

Special lubricants may be required for food and drug industry applications where contact with the product being manufactured may occur. Consult a lubrication manufacturer's representative for his recommendation.

CAUTION

Do not use EP oils or oils containing slippery additives such as graphite or molybdenum disulphide in the reducer when backstop is used. These additives will destroy sprag action. Failure to observe these precautions could result in damage to, or destruction of, the equipment.

GUIDELINES FOR TORQUE-ARM REDUCER LONG-TERM STORAGE

During periods of long storage, or when waiting for delivery or installation of other equipment, special care should be taken to protect a gear reducer to have it ready to be in the best condition when placed into service.

By taking special precautions, problems such as seal leakage and reducer failure due to the lack of lubrication, improper lubrication quantity, or contamination can be avoided. The following precautions will protect gear reducers during periods of extended storage:

Preparation

1. Drain the oil from the unit. Add a vapor phase corrosion inhibiting oil (VCI-105 oil by Daubert Chemical Co.) in accordance with Table 4.
2. Seal the unit air tight. Replace the vent plug with a standard pipe plug and wire the vent to the unit.
3. Cover the shaft extension with a waxy rust preventative compound that will keep oxygen away from the bare metal. (Non-Rust X-110 by Daubert Chemical Co.)
4. The instruction manuals and lubrication tags are paper and must be kept dry. Either remove these documents and store them inside or cover the unit with a durable waterproof cover which can keep moisture away.

5. Protect the reducer from dust, moisture, and other contaminants by storing the unit in a dry area.
6. In damp environments, the reducer should be packed inside a moisture-proof container or an envelope of polyethylene containing a desiccant material. If the reducer is to be stored outdoors, cover the entire exterior with a rust preventative.

When Placing the Reducer into Service

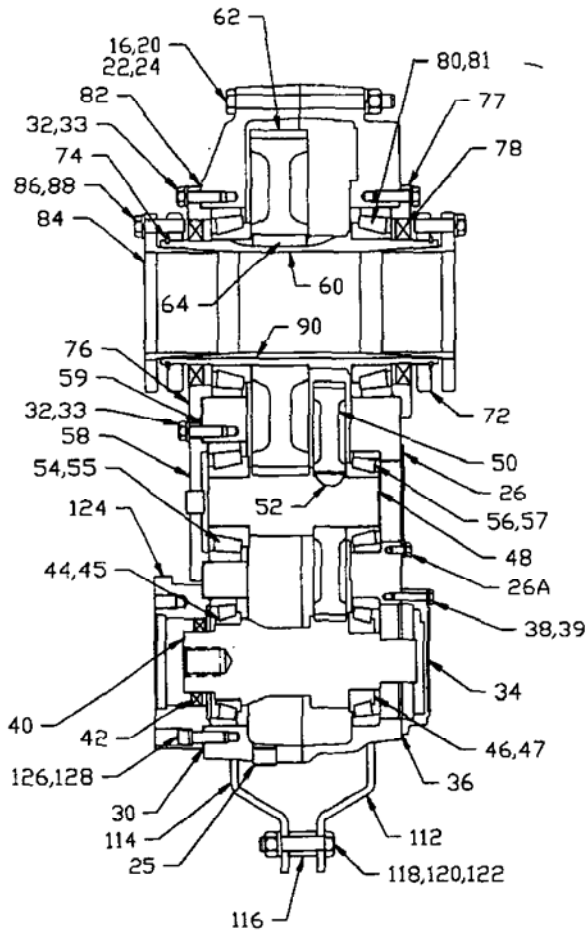
1. Assemble the vent plug into the proper hole.
2. Clean the shaft extensions with petroleum solvents.
3. Fill the unit to the proper oil level using a recommended lubricant. The VCI oil will not affect the new lubricant.
4. Follow the installation instructions provided in this manual.

Table 4 – Quantities of VCI #105 Oil

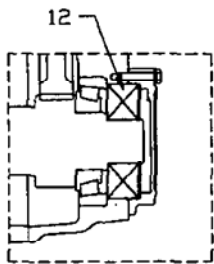
Case Size	Quarts or Liters
HXT625	.4
HXT725	.5

VCI #105 & #10 are interchangeable.
VCI #105 is more readily available.

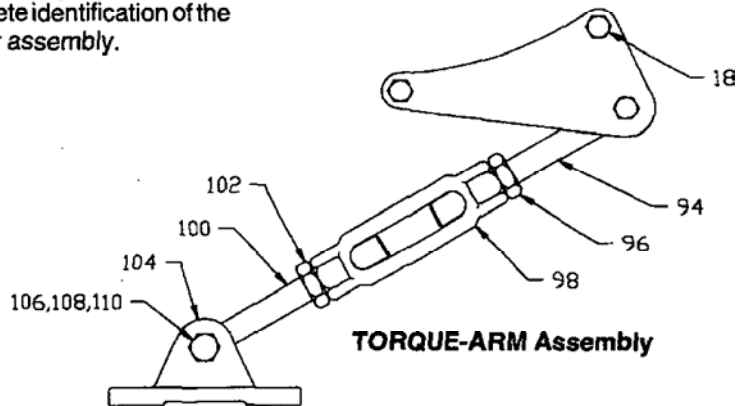
**PARTS FOR HXT6 6B & HXT7 6B TAPER BUSHED
HYDROIL SPEED REDUCERS**



Note: The two-digit numbers are for reference only. Order parts by the six-digit numbers in the Parts List. Each six-digit number is a complete identification of the part or assembly.



Backstop Assembly



TORQUE-ARM Assembly

Reference	Name of Part	No. Req'd.	HXT6 Part No.	HXT7 Part No.	Reference	Name of Part	No. Req'd.	HXT6 Part No.	HXT7 Part No.
12	Backstop Assembly	1	246092	247260	82*	Output Hub Bearing Shim Pack	‡	391187	390444
14	HOUSING	1	246170	247180		.002" Thick	†	427470	427525
15						.005" Thick	†	427471	427527
16	Air Vent	1	245237	390061		.010" Thick	†	427472	427528
18	Housing Bolt	6	411466	411498		.025" Thick	†	427473	427558
20	Adapter Housing Bolt	2	411468	411499		2 ³ / ₁₆ " Bore	1	246261	.....
22	Lockwasher	8	419013	419016		2 ¹ / ₄ " Bore	1	246262	.....
24	Hex Nut	8	407091	407095		2 ⁷ / ₁₆ " Bore	1	246263	272125
24	Dowel Pin	2	420112	420128	84	BUSHING	1	246264	272149
25	Pipe Plug	2	430033	430035		2 ¹ / ₂ " Bore	1	246265	272147
25	Magnetic Plug	1	430062	430064		2 ¹³ / ₁₆ " Bore	1	.....	272130
26	Countershaft Brg. Cover (Backstop Side)	1	246015	247011		2 ⁷ / ₈ " Bore	1	246266	272131
26A	Countershaft Cover Screws	6	411394	411394		2 ¹⁵ / ₁₆ " Bore	1	246267	272132
	Countershaft Cover Washers	6	419009	419009		3" Bore	1	246283	272133
30	Input Shaft Bearing Shim Pack	‡	391164	390420		3 ³ / ₁₆ " Bore	1	.....	272134
	.D02" Thick	†	427478	427578	86	▲ Bushing Screw	6	411435	411456
	.D05" Thick	†	427479	427584	88	▲ Lockwasher	6	419012	419013
	.D10" Thick	†	427480	427604		2 ³ / ₁₆ " Bore	1	443211	.....
	.D25" Thick	†	427481	427618		2 ¹ / ₄ " Bore	1	443211	.....
32	Carner and Cover Screws	■	411408	411433		2 ⁷ / ₁₆ " Bore	1	443214	443248
33	Lockwasher	■	419011	419012		2 ¹ / ₂ " Bore	1	443214	443248
34	Backstop Cover	1	246221	247221	90	▲ Key	1	443238	443248
36	Backstop Cover Gasket	1	246220	246220		Bushing	1	.....	443199
38	Backstop Cover Screw	6	411404	411402		to Shaft	1	443236	443199
39	Lockwasher	6	419009	419009		2 ¹⁵ / ₁₆ " Bore	1	443237	443199
40*	Input Shaft with Pinion 25:1 Ratio	1	246521	247521		3" Bore	1	443252	243216
42*	Input Shaft Seal	1	246524	246524		3 ³ / ₁₆ " Bore	1	.....	443235
44*	Input Shaft Brg. Cone	1	402196	402150		3 ⁷ / ₁₆ " Bore	1	443213	443217
45*	(Input Side) Cup	1	403091	403106	92	▲ Key, Bushing to Output Hub	1	443212	.....
46*	Input Shaft Brg. Cone	1	402197	402088		2 ³ / ₁₆ " through 2 ¹ / ₂ " Bore	1	.....	443218
47*	(Backstop Side) Cup	1	403091	403047		2 ⁷ / ₁₆ " through 3" Bore	1	.....	443198
48	COUNTERSHAFT ASSEMBLY* 25:1 Ratio	1	391186	391197		TORQUE-ARM ASSEMBLY*	1	246097	247098
50*	Countershaft with Pinion	1	246294	247002	94	▲ Rod End	1	245245	247239
50*	First Reduction Gear	1	246293	247005	96	▲ Hex Nut	1	407097	407099
52*	Key	2	245218	247218	98	▲ Tumbuckle	1	245246	247246
54*	Countershaft Brg. Cone	1	402054	402256	100	▲ Extension	1	245247	247240
55*	(Input Side) Cup	1	403159	403053	102	▲ L.H. Hex Nut	1	407246	407248
56*	Countershaft Brg. Cone	1	402052	402256	104	▲ Fulcrum	1	247248	247239
57*	(Backstop Side) Cup	1	403142	403053	106	▲ Fulcrum Screw	1	411489	411489
58	Countershaft Brg. Cover (Input Side)	1	246185	247194	108	▲ Lockwasher	1	419014	409014
59*	Countershaft Brg. Shim Pack	‡	391165	390429	110	▲ Hex Nut	1	407093	407093
	.002" Thick	†	427474	427690		ADAPTER ASSEMBLY*	1	.....	.....
	.005" Thick	†	427475	427691	112	▲ R.H. Adapter Plate	1	246242	247242
	.010" Thick	†	427476	427692	114	▲ L.H. Adapter Plate	1	246241	247241
	.025" Thick	†	427477	427693	116	▲ Adapter Bushing	1	245243	247244
60*	OUTPUT HUB ASSEMBLY* Taper Bushed Output Hub	1	390935	390941	118	▲ Adapter Bolt	1	411460	411485
62*	Taper Bushed Output Gear	1	246269	272137	120	▲ Lockwasher	1	419013	419014
64*	Output Gear Key	2	241217	245217	122	▲ Hex Nut	1	407091	407093
66*	Output Hub Snap Ring	1	421033	421038	124	Motor Adapter 25:1 Ratio	1	246522	247522
72	Bushing Back-up Plate	2	246270	272138	126	Adapter Screw	6	417108	417141
74	Retaining Ring	4	421055	421099	128	Lockwasher	6	419047	419048
76	Output Hub Seal Carrier (Input Side)	1	246186	247315	* Includes parts listed immediately below marked "#tu" HXT 6 & 7 housing assembly also includes a two-piece housing. Bushing assembly includes 2 bushings. ▲ Parts marked "#tu" make up the assemblies under which they are listed. c Not shown on drawing. • 1 set req'd. on size HXT6; 2 sets req'd. on size HXT7. ‡ One set consists of one each of the shims listed immediately below marked "†". † See last paragraph under "ORDERING PARTS." 24 req'd. on HXT6; 28 req'd. on HXT7. * Recommended spare parts				
77	Output Hub Seal Carrier (Backstop side)	1	246186	247315					
78*	Output Hub Seal	2	246302	247302					
80*	Output Hub Cone	2	402050	402058					
81*	Bearing Cup	2	403140	403111					

REPLACEMENT OF PARTS

IMPORTANT:

Using tools normally found in a maintenance department, a HYDROIL TORQUE-ARM speed reducer can be disassembled and reassembled by careful attention to the instructions following.

Cleanliness is very important to prevent the introduction of dirt into the bearings and other parts of the reducer. A tank of clean solvent, an arbor press, and equipment for heating bearings and gears should be available for shrinking these parts on shafts.

Our factory is prepared to repair reducers for customers who do not have proper facilities or who for any reason desire factory service.

The oil seals are of the rubbing type, and considerable care should be used during disassembly and reassembly to avoid damage to the surface on which the seals rub.

ORDERING PARTS:

When ordering parts for reducer, specify reducer size number, part name, part number and quantity.

It is strongly recommended that when a pinion or gear is replaced, the mating gear or pinion be replaced also.

If the large gear on the output hub must be replaced, it is recommended that an output hub assembly of a gear assembled on a hub be ordered to secure undamaged surfaces on the output hub where the oil seals rub. However, if it is desired to use the old output hub, press the gear and bearing off and carefully examine the rubbing surface under the oil seal for possible scratching or other damage resulting from the pressing operation. To prevent oil leakage at the shaft oil seals, the smooth surface of the output hub must not be damaged.

If any parts must be pressed from a shaft or from the output hub, this should be done before ordering parts to make sure that none of the bearings or other parts are damaged in removal.

Because old oil seals may be damaged in disassembly, it is advisable to order replacements for these parts.

If replacing a bearing or a shaft, it is advisable to order a set of shims for adjustment of bearings on the shaft assembly. If replacing a housing, a set of shims should be ordered for each shaft assembly because the adjustment of the bearings on each shaft assembly is affected.

REMOVING TAPER BUSHED REDUCER FROM SHAFT:

WARNING

External loads may cause machine movement. Block machine before removing any drive train components. Failure to observe these precautions could result in bodily injury.

WARNING

To ensure that drive is not unexpectedly started, turn off and lock out or tag power source before proceeding. Failure to observe this precaution could result in bodily injury.

1. Remove bushing screws.
2. Place the screws in the threaded holes provided in the bushing flanges. Tighten the screws alternately and evenly until the bushings are free on the shaft. For ease of tightening screws, make sure screw threads and threaded holes in bushing flanges are clean.
3. Remove the outside bushing, the reducer and then the inboard bushing.

DISASSEMBLY:

1. Remove all bolts from housing. Remove back-up plates and snap rings on the output hub of taper-bushed reducers. Open housing evenly to prevent damage to parts inside.
2. Lift shaft, gear and bearing assemblies from housing.
3. Remove seals, seal carriers and bearing cups from housing.

REASSEMBLY:

1. **Output Hub Assembly:** Heat gear to 325° to 350°F to shrink on output hub. Heat bearing cones to 270° to 290°F to shrink on hub.
2. **Countershaft Assembly:** Heat gear to 325° to 350°F and bearing cones to 270° to 290°F to shrink on shaft.
3. **Input Shaft Assembly:** Heat bearing cones to 270° to 290°F to shrink on shaft.
4. Place a .010" shim on output hub seal carrier for right hand half of housing (as viewed in drawing). Place a 1/8" dia. bead on Dow Corning RTV732 sealant on the face around the I.D. of the shim (seal is to be between reducer housing and shim). Caution: If too much sealant is used it will run into bearing and too little sealant will result in an ineffective seal. Install output hub seal carrier and countershaft bearing cover in right hand housing half and tighten screws to recommended torque in Table 5. Place bearing cups in right hand housing half. Make certain the cups are properly seated in housing. Place housing half on blocks to allow for protruding end of output hub.
5. Mesh output hub and countershaft assembly together and place in housing half. Place input shaft in position. Make sure rollers are properly seated in bearing cups.
6. Clean housing flange surfaces on both halves, making sure not to nick or scratch flange face. Place

a new bead of gasket replacer on flange face and spread evenly over entire flange leaving no bare spots. Place other housing half into position and tap with a soft hammer (rawhide, not lead hammer) until housing bolts can be used or draw housing halves together. Torque housing bolts per torque values listed below.

7. Place the output hub seal carrier in position without shims and install two cap screws diametrically opposed. Torque each screw to 25 lb.-in. Rotate the shaft to roll in the bearings and then torque each screw once to 50 lb.-in. **Do not retorquing the screws.** Turn shaft again to roll in the bearings. With a feeler gauge, check the gap between carrier and housing, clockwise from and next to each screw. To determine required shim thickness, add the average of the two feeler gauge readings to .013". Remove the carrier and install the required shims. Note: Total shim thickness per carrier or cover should not include more than .009" plastic shims. All other shims should be metal and each plastic shim should be inserted between two metal shims. Place a 1/8" dia. bead of Dow Corning RTV732 sealant on the face around the I.D. of the last shim and install output hub carrier in reducer housing. Tighten carrier bolts to recommended torque in Table 5. Output hub should have an axial end play of .001" to .003".
8. Adjust the countershaft bearings using the same method as in step 7, except to determine shim thickness required add the average of the feeler gauge readings to .013" and the axial end play should be .001" to .003".

9. Again using the same procedure as in step 7, adjust the input shaft bearings, except add the average of the feeler gauge readings to 0.16" to determine required shim thickness and the axial end play should be .002" to .004.
10. Apply sealant to backstop cover gasket and install backstop cover. Extreme care should be used in installing seals to avoid damage due to contact with sharp edges of the keyseat in the input shaft and holes in the output hub. This danger of damage and consequent oil leakage can be decreased by covering the keyseat and the holes with paper or tape which can be removed after seals are in place. Chamfer or burr housing bore if end of bore is sharp or rough. Fill cavity between lips of seal with grease. Seals should be pressed or tapped with a soft hammer (rawhide, not lead hammer) evenly into place in the housing, applying force only on the outer corner of the seals. A slight oil leakage at the seal may be evident during initial running in, but will disappear unless the seals have been damaged.
11. Install bushing back-up plate and snap rings.

Table 5 – Torque Values

Reducer Size	Recommended Torque (lb.-ins.)			
	Housing Bolts	Ctrshft. Brg. Cover Screws	Output Hub Seal Carrier Screws	Input Brg. Cover Screws
HXT6	900	360	360	120
HXT7	1620	600	600	120

Table 6 – Manufacturers’ Part Numbers For Replacement Output Hub Bearings

TORQUE-ARM Reducer Size	Output Hub Bearing	
	DODGE Part Number	Timken Part Number
HXT6	402050	JM822049
	403140	JM822010
HXT7	402058	48290
	403111	48220

Table 7 – Manufacturers’ Part Numbers For Replacement Countershaft Bearings

TORQUE-ARM Reducer Size	Countershaft Bearing Input Side		Countershaft Bearing Backstop Side	
	DODGE Part No.	Timken Part No.	DODGE Part No.	Timken Part No.
HXT6	402054	HM807040	402052	HM803149
	403159	HM807010	403142	HM803110
HXT7	402256	JHM807045	402256	JHM807045
	403053	JHM807012	403053	JHM807012

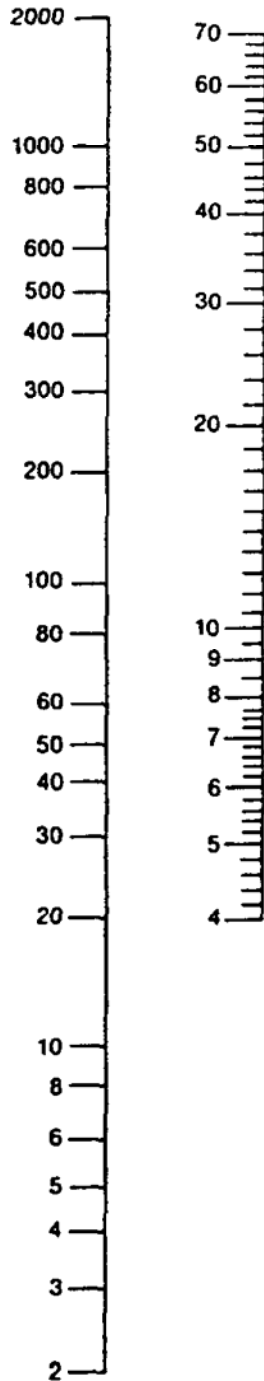
Table 8 – Manufacturers’ Part Numbers For Replacement Input Shaft Bearings

TORQUE-ARM Reducer Size	Input Bearing Input Side		Input Bearing Backstop Side	
	DODGE Part No.	Timken Part No.	DODGE Part No.	Timken Part No.
HXT6	402196	395A	402197	396
	403091	3920	403091	3920
HXT7	402150	39590	402088	455
	403106	39520	403047	452

Viscosity Classification Equivalents

KINEMATIC VISCOSITIES

cSt/
40°C cSt/
100°C



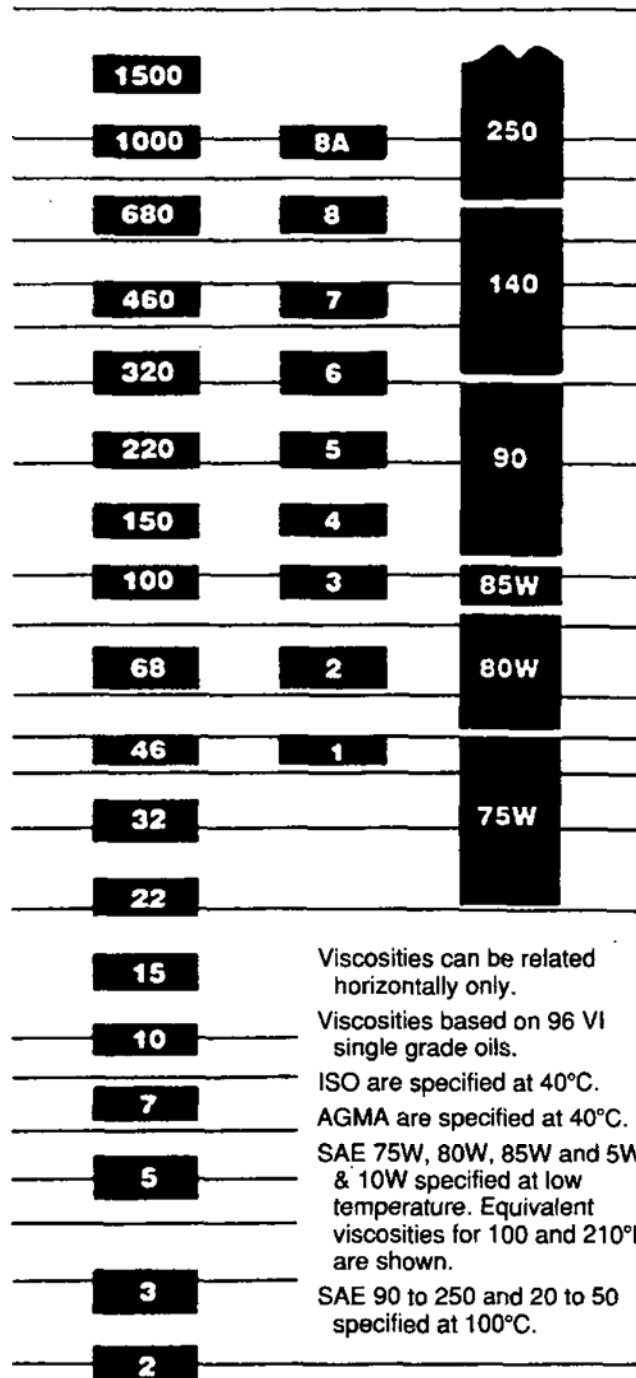
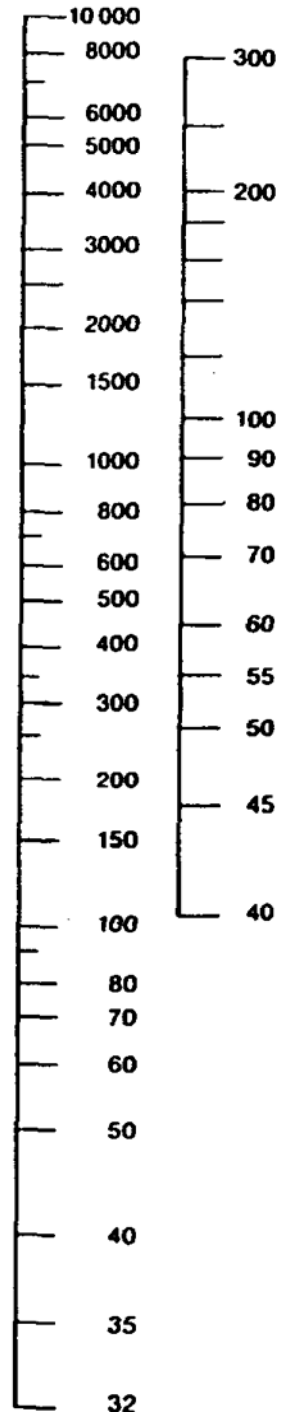
ISO VG

AGMA GRADES

SAE GRADES
GEAR OILS

SAYBOLT VISCOSITIES

SUS/
100°F SUS/
210°F



Viscosities can be related horizontally only.

Viscosities based on 96 VI single grade oils.

ISO are specified at 40°C.

AGMA are specified at 40°C.

SAE 75W, 80W, 85W and 5W & 10W specified at low temperature. Equivalent viscosities for 100 and 210°F are shown.

SAE 90 to 250 and 20 to 50 specified at 100°C.